

Vol. XII

No. 5

DISSERTATION

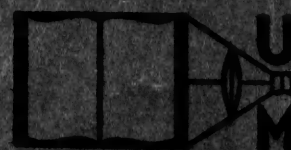
ABSTRACTS

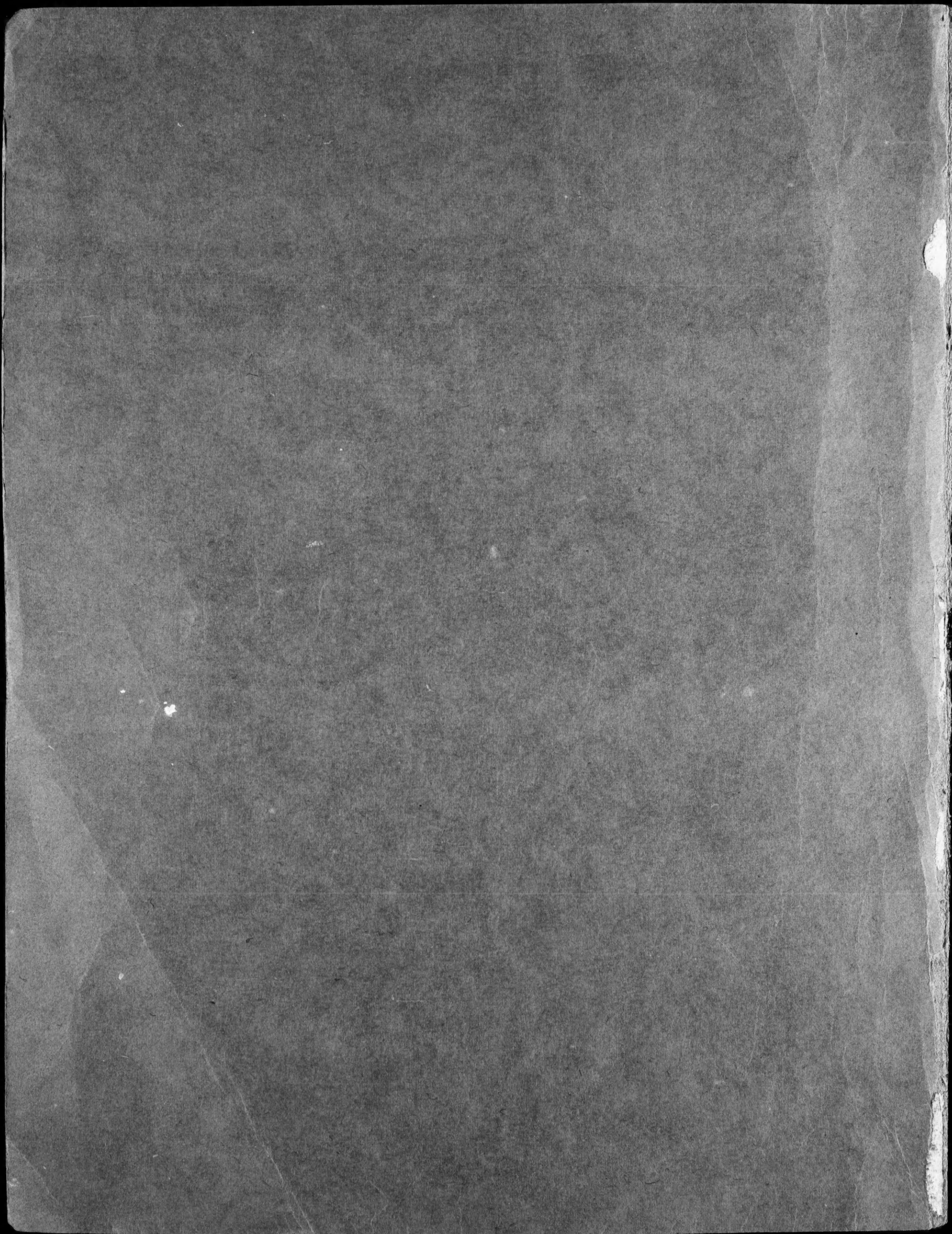
(formerly MICROFILM ABSTRACTS)

*A GUIDE TO DISSERTATIONS AND
MONOGRAPHS AVAILABLE IN MICROFORM*

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*A GUIDE TO DISSERTATIONS AND
MONOGRAPHS AVAILABLE IN MICROFORM*

UNIVERSITY MICROFILMS
ANN ARBOR, MICHIGAN: 1952

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INTRODUCTION

With a view toward a more accurate and descriptive title, the name MICROFILM ABSTRACTS has been changed to DISSERTATION ABSTRACTS. The format has been changed from 5 1/2 x 8 1/2 inches to 8 1/2 x 11 inches, since with this larger size less shelf space will be required in libraries. There will be six issues per year, one containing cumulative author and subject indexes for the year. The free distribution to selected libraries has been discontinued in favor of a straight subscription basis.

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It is anticipated that by enlarging the scope of DISSERTATION ABSTRACTS this publication will become of increasing value to librarians and scholars as a research tool. If this ideal is to be realized, close cooperation between sponsoring institutions, doctoral candidates, and University Microfilms is of the utmost importance. Now that the service is available to all Graduate schools regardless of the way its candidates publish their dissertations, it is hoped that the goal of a complete bibliography of doctoral dissertations may be realized within the next few years. Institutions are urged to write for further details.

Upon recommendation of the Committee on Microfilming of Doctoral Dissertations of the Association of Research Libraries, the subject headings have been adjusted to agree with those used by Trotier in DOCTORAL DISSERTATIONS.* For this volume, then, there is a mixed system of subject headings. It is anticipated that in succeeding volumes the classification headings will be better systematized and clarified.

*DOCTORAL DISSERTATIONS ACCEPTED BY AMERICAN UNIVERSITIES. 1949-50 (Number 17).
ed. A. H. Trotier and M. Harman. New York, 1950.

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BIOLOGICAL SCIENCES

AGRICULTURE

CROSSBREEDING IN SWINE

(Publication No. 4123)

David Charles England, Ph.D.
University of Minnesota, 1952

The results of crossing inbred lines of swine have been analyzed. The lines involved have been developed by a method utilizing (1) a flexible system of inbreeding in which the best performing males within a population were mated to the best performing females, and (2) rigid selection for the characters of economic importance in which the system of selection was flexible enough to permit major emphasis to be placed on the various elements of total performance as dictated by the material available and the need present. Performance has been measured by fertility, survival, rate of gain, economy of gain, and ability to satisfy market requirements.

The analysis was performed in such a manner as to reveal the relationship to maximum vigor of two important factors affecting the amount of vigor expressed in crosses, namely (1) genetic diversity of parental lines and (2) the *per se* performance of inbred lines. Such analysis indicated that (1) in swine crosses the amount of vigor expressed in performance above parental averages increases with increasing genetic diversity, and (2) the higher performing lines produce the higher performing crosses.

Continuous crosses were superior to single crosses. Continuous crosses of three lines showed an advantage over continuous crosses of two lines. The latter was interpreted as an effect of added genetic diversity rather than as an accumulation of additional favorable genes as such. Evidence was presented which confirms the genetic reasoning that systematically produced crossbreds should not "run out." Calculation of the coefficient of variation revealed that in general the crossbred pigs were more uniform than the inbreds and that crossbred pigs from crossbred dams were less variable than crossbred pigs from inbred dams. The opposite effects of inbreeding and crossbreeding on uniformity and the effects upon uniformity of heterosis and the "coadapted" genotypes of inbred lines developed with major emphasis on performance were discussed. These latter two factors tend to reduce variation in crosses of inbred lines.

Crosses of inbred lines possessed a backfat thickness intermediate to the parent lines and appreciably less backfat than outbred swine used for comparison. This indicates that (1) backfat is inherited, and (2) that fat content of the carcass will respond to attempted improvement.

Data were presented which indicate that

relatively heterozygous boars sire slightly more crossbred pigs per litter than do relatively homozygous boars. Suggested reasons include (1) earlier physiological maturity of crossbred boars, (2) fewer abnormal sperm from crossbred boars (3) an effect of the vigor of the individual on the "vigor" of sperm cells and the consequent effect of such on the very early prenatal survival of the embryo before the genotype of the zygote becomes fully effective, in so far as it is responsible, for prenatal survival. It was concluded that the effect — if any other than an all or none effect exists — produced by the relatively heterozygous boar occurs before the genotype of the zygote reaches its full effectiveness in determining prenatal survival.

The effect of the level of performance of inbred lines as such on the performance of crosses of these lines indicates that maximum crossbred production will be achieved only through the use of highly productive inbred lines. There is no apparent reason to believe that alleles of high additive potential possess less interactive potential than genes of low additive potential. Since high performing individuals are the result of highly effective combinations of genes and since the method of development employed in forming the Minnesota lines tends to preserve these combinations, it is in full accord with genetic reasoning that the better lines should produce superior crosses.

Two important factors in designing a crossbreeding program are (1) the choice of high performing inbred lines or crossbreds arising from them, and (2) formulation of a system of rotation which will provide the maximum opportunity for utilization of the existent genetic diversity. Such a program will require a knowledge of both the origin of the lines involved and the *per se* performance of these lines.

Microfilm copy of complete manuscript of 121 pages, \$1.51. Enlargements 6" x 8", 10¢ per page.

A STUDY OF THE PERFORMANCE OF INBRED LINE CROSSES IN THE DOMESTIC FOWL

(Publication No. 4129)

William Alexander Johnson, Ph.D.
University of Minnesota, 1952

The effect of crossing inbred lines of poultry was studied by comparing the performance of nine characteristics in single, three way and double crosses among seven inbred lines with their parental inbred lines. The data involves birds hatched in 1945 through 1951 and include the performance of seven inbred lines, 28 single crosses, 23 three way crosses and 17 double crosses. The inbreeding lines ranged from 21 to 65 percent.

No heterosis effects were found in fertility, adult body weight nor adult livability. Significant increases in performance were obtained in hatchability, eight weeks livability, eight weeks weight, age at first egg, egg size and 500 day egg production. The greatest heterosis effects were expressed in hatchability, eight weeks weight and 500 day egg production. An increased heterosis effect was obtained in single crosses when lines of diverse genetic origin were crossed. There were no significant differences among the performances of the single, three way and double crosses. A slight trend is evident that variability of performance decreases as the number of lines involved in a cross increases. It is indicated that the development of inbred lines and their subsequent crossing is a sound method of breeding in order to improve the economic characters of poultry. The three way cross is suggested as the most practical commercial cross.

The predicted performance of multiple crosses was correlated with actual performance. The nine methods of estimating performance were as follows:

- A. The mean performance of single crosses excluding the parent line crosses in a specific cross.
- B. The mean performance of all single crosses in a specific cross.
- C. The mean of the combining ability in all possible single crosses.
- D. The mean of the combining ability of lines determined by inbred tester lines.
- E. The mean of the combining ability of lines determined by two out-bred tester lines.
- F. Same as method A including the reciprocal crosses.
- G. Same as method B including the reciprocal crosses.
- H. Estimates of combining ability for each sex with a method similar to method C.
- I. Actual performance of the inbred lines was used as a measure of combining ability.

Of the nine prediction methods, B gave slightly higher association than did the other methods. Methods D and I are of questionable value. Method D tends to overestimate performance whereas method I underestimates performance. Eight weeks livability could not be predicted. The best performing three way and four way crosses could be predicted from single cross performance for body weight, eight weeks weight and 500 day egg production. The association for the other five traits is not high enough for accurate prediction. High enough association was found between parental inbred lines and their subsequent crosses to indicate that inbred lines with good performance tend to have the better performing crosses.

Microfilm copy of complete manuscript of 110 pages, \$1.38. Enlargements 6" x 8", 10¢ per page.

AGRONOMY

INHERITANCE OF LEAF RUST, *PUCCINIA RUBIGO-VERA TRITICI* (ERIKSS. AND HENN.) CARL., REACTION AND OTHER CHARACTERS IN CROSSES AMONG THREE WHEAT VARIETIES

(Publication No. 4136)

Elmer George Heyne, Ph.D.
University of Minnesota, 1952

The primary purpose of this problem was to study the mode of inheritance of leaf rust reaction in the seedling stage to individual races and the reaction in adult stage to a collection of races in the field and association between these two responses. The mode of inheritance of several other characters which differentiate the parents were also studied.

The parental varieties used were two winter wheat varieties, Pawnee and RedChief, and a spring wheat variety, Timstein. The three possible crosses among these varieties were made and the segregating generations studied in the greenhouse and field. Common techniques were used in the study of the adult and seedling reactions.

Timstein was resistant to races 5, 9, 15, 44, and 126 in the seedling stage, Pawnee was resistant to race 9 and RedChief susceptible to all these races. Timstein was resistant in the adult stage to these same races of leaf rust and other races that occurred naturally in the field in Kansas in 1949 and 1950. Pawnee and RedChief were susceptible to the collection of races used in the field. Timstein was resistant in the adult stage to the races 17, 38 and 56 of stem rust introduced artificially in the field and naturally occurring races in 1949. Pawnee and RedChief were susceptible in the adult stage to the collection of stem rust races present in the field in 1949.

The adult reaction of F_3 and F_4 lines of the cross Pawnee by Timstein indicated one major recessive factor controlling leaf rust reaction. The occurrence of lines breeding true for moderate resistance suggested one or more modifying factors present in this cross. In the cross RedChief by Timstein there appeared to be two recessive factors controlling leaf rust reaction, one having a major effect and the other a modifying or additive effect. All plants of the F_2 generation of the cross Pawnee by RedChief were susceptible to leaf rust in the adult stage.

The stem rust reaction of the F_3 generation in the adult stage in the crosses Pawnee by Timstein and RedChief by Timstein was explained by suggesting one major dominant factor from Timstein for resistance. All plants of the F_2 generation of the cross Pawnee by RedChief cross were susceptible to stem rust in the field.

Reaction of seedling plants in the greenhouse to races 9, 15 and 126 in the cross RedChief by Timstein showed that the resistance of Timstein was governed by one major recessive factor and at least one modifying factor to explain the occurrence of lines that bred true for moderate resistance. Several F_3 lines were also studied for reaction to race

44 and a number of F_3 , F_4 and F_5 lines for reaction to race 5. The reaction to races 5, 9, 15, 44 and 126 was similar, indicating that the same factors present in Timstein controlled reaction to these races.

Seedling studies in the cross Pawnee by Timstein indicated that for reaction to race 9, Pawnee and Timstein each contributed at least one major factor for resistance, and that they were non-allelic and the Pawnee factor also at least partially epistatic to Timstein's factors. Pawnee's factor was partially dominant for resistance to race 9 and Timstein's factor nearly recessive. The occurrence of lines breeding true for moderate type of resistance in this cross indicated that additional modifying factors were present and probably were contributed by each parent. The reaction to races 15 and 126 suggested that perhaps one major recessive factor from Timstein governed the reaction to these races but again the occurrence of true breeding classes different from either parent indicated additional modifying factors. The response of F_3 lines to races 5, 15, 44 and 126 were similar indicating the same factors governed resistance to all these races.

The Timstein factors for resistance to leaf rust races 5, 9, 15, 44 and 126 in the seedling stage appeared to be associated in inheritance such that about one-half of the lines highly resistant in the adult stage to a collection of races were also highly resistant to the five individual races in the seedling stage.

There was an association between Pawnee's factor for resistance to race 9 of leaf rust and Timstein's adult reaction to stem rust in the field with a recombination value of 21.8 ± 7.8 per cent.

Pawnee has one factor pair for red seed color that is different from the two factor pairs carried by RedChief. Timstein has white seed.

RedChief and Timstein have the same factor for awn expression (awnleted) and both of these varieties differ by a single nearly dominant factor from the bearded expression of Pawnee.

Chi-square tests for independence indicated there were no associations between the Pawnee type reaction to race 9 and awn expression, seed color, winter injury and reaction to races 15 and 126; nor between the Timstein type of leaf rust reaction and seed color, stem rust reaction, awn-expression and winter injury; nor between stem rust reaction and seed color and awn expression.

Microfilm copy of complete manuscript of 68 pages, \$1.00. Enlargements 6" x 8", 10¢ per page.

BACTERIOLOGY AND MICROBIOLOGY

A MICROBIOLOGICAL STUDY OF MICHIGAN PEAT

(Publication No. 4293)

Scott V. Covert, Ph. D.
University of Pennsylvania, 1949

A microbiological study of peat from the bog in St. Clair and Lapeer Counties near Capac, Michigan was made to determine the cellulolytic organisms contained in this material. That microorganisms active in the breakdown of cellulose are present in peat is indicated by an observation which was instrumental in initiating this investigation. The present investigation was suggested by the observation that a certain peat, marketed commercially as "Michigan Peat," when stored on wooden floors or packed in burlap bags, brought about a dramatic destruction of these materials. It was felt that since this material carried on such a rapid and thorough destruction of substances comprised essentially of cellulose it would contain cellulolytic organisms in considerable number and lend itself to an investigation of the interplay of such organisms.

The investigation was carried out in four phases in which isolations of the aerobic, anaerobic and thermophilic organisms were made and their relative abilities to decompose cellulose singly or in combination were tested quantitatively by means of a breaking strength test of cotton strips. The cotton strips were inoculated with the different organisms either singly or in combinations of two or three, incubated for four weeks and then tested on a motor driven Scott break testing machine. A comparison of the test strips with control strips subjected to conditions identical in every respect except for inoculation indicated the degree of cellulolytic activity.

Michigan peat was found to be rich in aerobic cellulose decomposing organisms consisting of fungi and actinomycetes. Quantitative tests in pure culture showed that in many cases this function was so rapid and complete that it was impossible to remove test strips of cotton from the bottles, the strips falling apart when touched with forceps after incubating for only one week. This flora is probably the basis of the rapid destruction of wooden flooring and burlap bags cited above.

Repeated attempts to isolate organisms from Michigan Peat on a cellulose enrichment culture medium under anaerobic conditions failed to reveal such a flora. Strips incubated in the peat under anaerobic conditions when tested in the breaking machine showed no loss in the strength of the cotton strips.

No cellulolytic thermophiles could be isolated from this peat and break tests on cotton strips buried in peat and incubated at a temperature of 56°C confirmed the lack of such activity.

While the violent action of this peat could be explained on the basis of the number of potent aerobic degraders alone, there was reason to suspect that the final result was not entirely due to the additive effect of these organisms. Two examples of synergistic

reaction were demonstrated between organisms isolated in this study. In one case the interaction takes place between two organisms of the genus *Streptomyces*, in the second the interaction is between *Bacillus* sp. and *Streptomyces* sp. The actual mechanism of these actions remains to be tested.

Several instances of inhibition of cellulolytic function among organisms isolated in this study have been demonstrated. In both the synergistic reactions and the inhibition reactions a statistical analysis of the tests has been carried out to determine the validity of the tests and the significance of the results.

A final observation demonstrated in the present study is the apparent enhancement of cellulolytic function of some microorganisms over a period of time. In the cultures there are two clear cut examples of this. When first isolated these cultures were grown on filter paper strips and exhibited little cellulolytic ability. After subculturing on filter paper strips for some length of time these cultures exhibited a greatly enhanced activity which was maintained even after subculturing on a medium where the carbon source was sucrose. It would appear that culturing on a substrate of cellulose has led to the selection of those organisms that already possessed this ability to a considerable degree or to a training of those organisms possessing it in only a minor degree.

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AN APPROACH TO THE MENSURATION OF DISINFECTANT PENETRABILITY

(Publication No. 4028)

Manley Mandel, Ph.D.
Michigan State College, 1952

A linear diffusion method employing agar gel stationary phases has been developed for the measurement of the penetrability of chemical disinfectants. This "penetube" technic separates the disinfection process from the growth of the indicator organisms and permits the distinction of bactericidal and bacteriostatic effects. Observation on the penetration of various disinfectants were made under different conditions by means of this new technic.

The relation of the penetrative powers of disinfectants as determined by the "penetube" technic to the disinfection of chicken feces was investigated. A hypothesis concerning the role of penetration in the disinfection process was formulated. This hypothesis concerns the formation of a dissociable organism-disinfectant complex as a necessary step in the assumption of the disinfection process as a combination of zero and first order reaction mechanisms. The possible roles of adsorption of disinfectant molecules by the organisms and of the distribution of resistance to disinfection among the component population are also discussed in relation to the hypothesis.

The high penetrability previously claimed for Colloidal Iodine was shown to be a function of its acid condition rather than an inherent property of Colloidal Iodine as such.

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SOME CONSIDERATIONS OF INHIBITORS OF INFLUENZA VIRUS ON HEMAGGLUTINATION AND INFECTION

(Publication No. 4099)

Eugene Claude Pirtle, Ph.D.
State University of Iowa, 1952

Several approaches were made concerning the problem of inhibitors affecting hemagglutination-inhibition and *in ovo* infection by a type A influenza virus.

It was discovered that in the presence of chicken erythrocytes the disappearance of hemagglutinin from virus preparations resuspended in various media differed a great deal. The suspending medium was a more decisive factor in the amount of hemagglutinin adsorbed than was the concentration of virus employed. Dialyzed and centrifuged virus resuspended in the supernatant fluid from dialyzed and centrifuged normal chorioallantoic fluid could be adsorbed to an extent somewhat comparable to that of virus resuspended in 0.9% NaCl. The data suggest that normal chorioallantoic fluid contains a high-speed sedimentable component and also a dialyzable factor, both of which play a part in virus-erythrocyte reactions.

It was shown that the sedimentable components of normal chorioallantoic fluid are antigenic, and that anti-bodies produced against them will reverse their inhibiting action both *in vitro* and *in ovo*. The effect of progressive immunization of normal rabbits with this antigenic material was determined by collecting periodic serum samples. The result was found to be a steady decrease in the inhibition of embryo infectivity by influenza virus and a constant rise in precipitin titer against the homologous antigen.

Mouse-donor antiserum, produced against influenza virus-infected chorioallantoic fluid, was adsorbed with the sedimentable components of normal chorioallantoic fluid. The resultant antiserum produced a minimal amount of undesirable sedimented erythrocyte patterns, and allowed much clearer end points in the hemagglutination-inhibition test.

The data suggest that non-specific inhibitions encountered with influenza virus should be given more consideration from the standpoint of factors which may be present along with the virus in the materials being studied.

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AN ANALYSIS OF THE PHENOMENON OF
"LONG TERM ADAPTATION" IN YEAST

(Publication No. 4016)

Raquel Berta Sussman, Ph.D.
University of Illinois, 1952

The phenomenon of "long term adaptation" was originally described by Winge and Roberts as the gradual acquisition of enzyme activity by the entire population during the course of several days growth, in the presence of galactose. These workers concluded that *Saccharomyces chevalieri* is a slow fermenter because of the presence of a recessive gene which can induce the production of enzyme only at a very slow rate.

The present investigation has demonstrated that the explanations offered by them to account for this process are not entirely consistent with the facts.

Analysis of the phenotypic changes which occur during slow adaptation has indicated that only a small proportion of the initial population can attain the ability to adapt and whose progeny are subsequently selected.

Further, in agreement with Winge and Roberts, it has been found that once transformed into a fermenter, *S.chevalieri* can synthesize the enzyme at a normal rate. Thus, it would appear that the ability to synthesize more enzyme is cytoplasmically controlled and does not depend upon a genic transformation. The latter conclusion is supported by variance analyses and reversion experiments which indicated that the change from non-fermenter to fermenter is induced by galactose and that in freshly transformed positives, mass reversion occurs in the absence of galactose. Thus, the transformation can be seen to involve an adaptive change in the cytoplasm against a homogeneous nuclear background.

The kinetics of appearance of positive cells when a culture of negatives is exposed to galactose and the selective relationships between positives and negatives have been investigated and are described.

Details have been recorded of attempts made to transform negative cells in the absence of growth, all of which were unsuccessful.

The present investigation has demonstrated that *S.chevalieri* is a very useful tool by which the study of cytoplasmic determinants of adaptive enzymes can be made possible. With this system, a distinction between enzyme content and enzyme forming system can be achieved. The properties of the latter can, thus, be determined and the conditions for its growth and transmission elucidated.

Microfilm copy of complete manuscript of 81 pages, \$1.01. Enlargements 6" x 8", 10¢ per page.

BIOCHEMISTRY

BIOCHEMICAL STUDIES OF VITAMIN C,
LABELED AS 1-C¹⁴-L-ASCORBIC ACID

(Publication No. 4254)

John Joseph Burns, Ph.D.
Columbia University, 1950

The overall metabolism of radioactive L-ascorbic acid, labeled with C¹⁴ in the carboxy position, was studied in normal and scorbutic guinea pigs. The labeled compound was synthesized by the addition of radioactive sodium cyanide to L-xylosone. The resulting imino-L-ascorbic acid was hydrolyzed to ascorbic acid which was purified from mineral salts and other impurities by ion-exchange. Pure L-ascorbic acid was obtained in 25 per cent yield after crystallization from an organic solvent mixture.

Isolation techniques similar to those used in the chemical synthesis of ascorbic acid were also employed to isolate biologically synthesized radioactive ascorbic acid from rat urine after administration of radioactive glucose. A method was developed for the partial degradation of the biosynthetic ascorbic acid by acid decarboxylation.

Feeding experiments were carried out with normal and scorbutic guinea pigs. The radioactivity appearing in the respiratory carbon dioxide during 24 hours was 20-30 per cent of the injected dose. The urine contained 3-6 per cent of the total activity and the feces 0.7 per cent. During a 10 day period after administration of 1-C¹⁴-L-ascorbic acid 68 per cent of total dose was found in the respiratory carbon dioxide and 22 per cent was excreted in the urine. The results of these experiments furnish the first definite evidence of the *in vivo* degradation of the carbon chain of ascorbic acid.

Calcium oxalate, isolated from the urine, contained 60 per cent of the total urine activity, demonstrating a precursor role of ascorbic acid in oxalate formation.

The overall distribution of radioactivity in organs and tissues of guinea pigs after administration of 1-C¹⁴-L-ascorbic acid was determined. The concentrations of C¹⁴ were approximately the same as found by chemical analyses for ascorbic acid. No marked differences were found in the distribution of C¹⁴ in the organs and tissues of normal and scorbutic guinea pigs.

The nasal septa was found to contain a higher concentration of C¹⁴ than such organs as liver, kidney and heart which is of interest in connection with the role of ascorbic acid in maintaining the normal state of cartilage.

Evidence was found indicating C¹⁴ incorporation into petroleum ether soluble fractions of the spleen. The data suggest a conjugation of ascorbic acid with a large non-polar group such as a steroid.

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A STUDY OF THE METABOLISM OF
HISTIDINE AND RELATED IMIDAZOLES IN
THE BODY OF THE MOUSE AND OF THE RAT
AND OF THE AVAILABILITY OF
D-TRYPTOPHAN IN THE MOUSE

(Publication No. 4053)

David Robert Celander, Ph.D.
State University of Iowa, 1952

D-Histidine, L-imidazolelactic acid, urocanic acid, imidazolepyruvic acid, imidazoleformaldehyde and imidazolecarboxylic acid have been prepared and tested in mice for their ability to replace L-histidine in diets containing either a histidine-deficient casein hydrolysate or a mixture of purified amino acids. Of the products tested, only imidazolepyruvic acid was capable of supporting slow to moderate growth in a diet completely devoid of histidine. Though either imidazolelactic acid or D-histidine brought about a slight retardation in rate of weight loss, neither would support growth in the absence of measurable amounts of L-histidine. The effect of L-histidine in this connection seemed to be mildly stimulatory rather than simply additive. Urocanic acid, imidazoleformaldehyde and imidazolecarboxylic acid had no capacity to stimulate growth even in the presence of traces of L-histidine.

When D-tryptophan was fed in a diet containing a mixture of purified amino acids otherwise devoid of tryptophan, it did not promote growth in mice and was unable to reduce weight loss. Traces of the L isomer rendered the D-tryptophan effective for slow to moderate growth.

The implications of the above observations are discussed. It is concluded that the previously reported availability of D-histidine and D-tryptophan for slow growth in mice was made possible by traces of the respective L amino acids in the yeast extract employed as source of the B complex.

Intestinal absorption and liver glycogen formation were determined at the end of four hours in male rats which had previously been fasted for 24 hours and then given approximately 0.5 gm. of L-histidine, urocanic acid or imidazolelactic acid by stomach tube. Imidazolelactic acid was absorbed slowly and did not give rise to glycogen. When this compound was fed as the sodium salt, the absorption was reduced nearly to zero. Though urocanic acid was absorbed relatively well, the livers of animals receiving it contained on the average only half as much glycogen as the livers of unfed controls and only one-fifth as much as the livers of animals fed L-histidine. Because urocanic acid did not promote glycogen formation, it is concluded that this compound as such is not an important intermediate on the pathway from histidine to glycogen.

A modification of the Macpherson test for the quantitative estimation of imidazoles has been devised.

When substituted in the diet of rats for L-histidine, D-histidine produced very rapid growth, but the growth engendered by imidazolelactic acid was very slow. Because growth was obtained on

D-histidine and imidazolelactic acid when these compounds were administered parenterally to rats receiving a histidine-deficient diet, it appears unnecessary to ascribe growth previously observed when these compounds were given orally to their conversion to L-histidine by intestinal microorganisms.

Whether it was incorporated into the diet or administered parenterally, urocanic acid was unable to support growth or maintenance in young rats fed a diet deficient in histidine.

Microfilm copy of complete manuscript of 86 pages, \$1.08. Enlargements 6" x 8", 10¢ per page.

THE EFFECT OF AGE, DIET, AND CARBON
TETRACHLORIDE-INDUCED LIVER INJURY ON
THE CHOLESTEROL CONTENT OF BLOOD AND
CERTAIN OTHER TISSUES IN THE ALBINO RAT

(Publication No. 4023)

Sing-pao Chiang, Ph.D.
Michigan State College, 1952

Many investigations of cholesterol metabolism have been carried out in connection with hypercholesterolemia and arteriosclerosis - one of the most common diseases of the aged people. The experimental animals usually used have been the dog, chick, rabbit, and guinea pig. The rat, however, has not been considered suitable for this purpose. The object of the present work was to study the effect of age, of diets, both adequate and inadequate in essential nutrients, and of carbon tetrachloride-induced liver injury on the cholesterol content of the blood, and tissues of the albino rat.

Studies were made of rats ranging from 5-37 months old, of rats with spontaneous mammary tumors, of young rats fed six different rations: stock, a diet of good nutritive value, a diet of lower nutritive value, two choline deficient diets, and a rachitogenic diet, and of rats with carbon tetrachloride-induced liver injury by both periodic exposure to its vapors and intraperitoneal injection of its solution in mineral oil.

Nitrogen, moisture, and total fat in the liver, the esterified fatty acids in the plasma were also determined in addition to the cholesterol content of the blood and tissues.

The results obtained showed no appreciable difference in cholesterol content of blood, and tissues with regard to age and sex. Rats with spontaneous mammary tumors showed that the blood cholesterol levels were generally high although considerable variations occurred.

The diet of lower nutritive value was found to produce a moderate degree of fatty liver and a slight increase in blood cholesterol. The feeding of choline deficient diets resulted in fatty livers, decrease in moisture content and increase in liver cholesterol, mainly the ester fraction. Choline deficient diet II containing the larger amount of fat produced the more severe symptoms. When rats, previously maintained

on choline deficient diet II were fed experimental diets I and II the deviation from the normal was markedly greater with the diet of lower nutritional value.

Rats fed a rachitogenic diet showed no difference from the normal in cholesterol content of the tissues studied.

Liver injury induced by periodic exposure to CCl_4 vapors resulted in fatty liver and an increase in liver cholesterol. The change was greatest in the case of diet II of lower nutritional value. Intraperitoneal injection of CCl_4 in mineral oil produced similar results. A dosage of 0.066 ml. per 100 g. body weight was found most suitable for experimental study.

From this study it might be concluded that in general rats encounter no difficulties in cholesterol metabolism except when their nutritional status is poor and when drastic damage is done to the tissues such as carbon tetrachloride-induced liver injury.

Microfilm copy of complete manuscript of 73 pages, \$1.00. Enlargements 6" x 8", 10¢ per page.

STUDIES ON CELL-FREE ENZYME PREPARATIONS FROM ACETOBACTER SUBOXYDANS OXIDIZING INOSITOL

(Publication No. 4179)

Robert E. Franzl, Ph.D.
Columbia University, 1952

A cell-free oxidative enzyme system from *Acetobacter suboxydans* was obtained by the differential centrifugation of phosphate buffer extracts of organisms crushed in a bacterial mill. The 20,000x g pellet aerobically oxidized glucose to gluconic acid. In the presence of an additional factor, several isomers of the inositol group and related cyclitols were oxidized by the enzyme preparation to their corresponding ketones in accordance with the rules governing the stereochemical specificity of the oxidation of these substrates by the resting organism. This essential factor was supplied by the addition of heat-inactivated cells, gelatin, gum arabic, and egg albumin to the 20,000x g pellet. A preparation obtained by treating heated cells with Na desoxycholate also functioned as an activator. Attempts to detach the enzyme from its particle were unsuccessful. Heating completely inactivated the enzyme system. The pH optimum of the oxidation of meso-inositol at 36° C. in phosphate buffer was at 6.5, while the Michaelis constant of the same system was 3.3×10^{-3} M. The use of several types of inhibitors indicated that the oxidation of meso-inositol did not involve functional -SH groups, and that this oxidation was not coupled with phosphorylation. The inhibition of the meso-inositol oxidation by 10^{-3} M potassium cyanide was not reversed by methylene blue, nor could the enzyme anaerobically dehydrogenate meso-inositol in the presence of this dye. This inositol-oxidizing enzyme may therefore be classified as an oxidase or an aerobic dehydrogenase.

The oxidation of d- and meso-inositol by the enzyme preparation from *Acetobacter suboxydans* was inhibited by 10^{-3} M colchicine. Of the several cycloheptatriene derivatives tested, tropolone and 4,5-tetramethylene tropolone also inhibited the inositol oxidation. This inhibition was shown to be non-competitive and specific for the enzyme present in the 20,000x g pellet. None of these compounds was effective in inhibiting the oxidation of glucose. Colchicine did not effect the growth of *Saccharomyces cerevisiae*, an inositol-requiring strain of yeast.

Microfilm copy of complete manuscript of 76 pages, \$1.00. Enlargements 6" x 8", 10¢ per page.

FREE RADICAL AND INFRARED STUDIES OF SOME TOCOPHEROLS AND OTHER 6-HYDROXYCHROMAN ANTIOXIDANTS

(Publication No. 4073)

George Everett Inglett, Ph.D.
State University of Iowa, 1952

The biological antioxidant, DL- α -tocopherol, has been found to react rapidly with benzoyl peroxide, bis-(m-chlorobenzoyl)-peroxide, and triphenylmethyl free radical in anhydrous benzene at 30°. Structure proof of the products isolated has been accomplished largely by infrared spectra analysis. The high percentage recovery of benzoic and m-chlorobenzoic acids provides analytical confirmation of Nozaki and Bartlett's kinetic data. Their data indicate that benzoyl peroxide first dissociates into benzoyloxy free radicals which react at a faster rate than that at which they lose carbon dioxide. The benzoyloxy radicals abstract the 6-hydroxyl hydrogen atoms of DL- α -tocopherol to give benzoic acid and DL- α -tocopheryloxy radicals which stabilize themselves to give DL- α -tocopherylquinone and a compound referred to as bis-(DL- α -tocopher-6-one)-peroxide. Triphenylmethyl radicals abstract hydrogen atoms from DL- α -tocopherol to give excellent yields of triphenylmethane and a transitory DL- α -tocopheryloxy radicals which undergo stabilization in some manner to give DL- α -tocopherylquinone, and several uncharacterized oils. These data constitute the first chemical evidence for the existence of a transitory DL- α -tocopheryloxy free radical.

2,2,5,7,8-Pentamethyl-6-hydroxychroman reacts with benzoyl peroxide in anhydrous benzene at 30° to give a monobenzoate of the 6-hydroxychroman antioxidant, benzoic acid, and smaller amounts of 3,5,6-trimethyl-2-(3'-methyl-3'-hydroxybutyl)-1,4-benzoquinone and a compound which is referred to as bis-(2,2,5,7,8-pentamethylchroman-6-one)-peroxide. Saponification of the ester with potassium hydroxide gave the latter peroxide and potassium benzoate.

When D- γ -tocopherol was reacted with benzoyl peroxide under similar conditions, only 2,7,8-trimethyl-2-(4',8',12'-trimethyltridecyl-1)-chroman-5,6-quinone and benzoic acid could be isolated. This supplements evidence which indicates that

D- γ -tocopherol is the precursor of this red quinone in autoxidizing cottonseed oil.

Microfilm copy of complete manuscript of 93 pages, \$1.16. Enlargements 6" x 8", 10¢ per page.

STUDIES OF THE BIOSYNTHESIS OF ASCORBIC ACID BY THE ALBINO RAT: THE SEPARATION OF ASCORBIC ACID BY ION EXCHANGE TECHNIQUES AND ITS ISOLATION AS THE 2,4-DINITROPHENYLOSAZONE AND A RADIOACTIVE TRACER STUDY OF GLUCOSE IN THE BIOSYNTHESIS OF ASCORBIC ACID

(Publication No. 4261)

Simon Samuel Jackel, Ph.D.
Columbia University, 1950

This investigation was undertaken to study the relationship of carbohydrates to ascorbic acid [vitamin C] biosynthesis in the albino rat. Radioactive C^{14} -D-glucose [uniformly labeled] and C^{14} -sodium bicarbonate were administered intraperitoneally to male albino rats of the Wistar strain which were excreting large quantities of ascorbic acid under the influence of chloretone. The distribution of radio-carbon in urinary ascorbic acid, expired carbon dioxide, liver glycogen, urine and feces was determined. After a period of 24 hours, 0.3 per cent of the administered glucose activity was found in the urinary ascorbic acid, while only 0.01 to 0.02 per cent of the bicarbonate radioactivity was incorporated into ascorbic acid excreted over the same time period. Partial degradation of the ascorbic acid isolated in connection with the experiments involving administration of uniformly labeled glucose indicated that carbons 1 and 2 together accounted for one-third of the total activity, suggesting that the ascorbic acid molecule was uniformly labeled.

The experimental data confirm the thesis that D-glucose is directly involved in ascorbic acid biosynthesis and that the conversion from glucose does not involve total degradation to carbon dioxide. The finding that the biosynthesized ascorbic acid reproduces the labeling present in the initial glucose molecule, demonstrates that ascorbic acid is synthesized either from the intact glucose chain or from carbon fragments maintained in the same ratio of radioactivity and derived from glucose in the same time sequence. Although these data are in agreement with suggestions proposed previously by Smythe and King and by Lardy that 3-carbon fragments derived from glucose metabolism may function as ascorbic acid precursors, they do not in any way rule out the possibility of synthesis by some mechanism that does not involve breaking the glucose chain.

The study was facilitated by the development of a semi-micro ion exchange procedure, applicable to the urine from a single rat, for the separation of ascorbic acid from the neutral and basic constituents of urine. By suitable pretreatment of the urine and

by resin conditioning, it was found possible to absorb and elute the vitamin with an overall recovery of 85 to 90 per cent. Ascorbic acid was isolated routinely from the anion exchange resin acid eluate as the 2,4-dinitrophenylosazone under temperature, concentration and acidity conditions permitting osazone formation to be complete in three hours. The chemical and radioactive purity of the material so isolated was established according to accepted criteria, and records of the near ultraviolet, visible and infrared absorption spectra are presented. A convenient method is detailed for the oxidative partial degradation of free L-ascorbic acid, also isolated from the ion exchange resin eluate, and isolation of the first two carbon atoms as calcium oxalate monohydrate.

Data are presented showing that oxalic acid is superior to metaphosphoric acid as a stabilizer of ascorbic acid in rat urine and that albino rats of the Sherman strain excrete considerably smaller quantities of ascorbic acid, both initially and in response to chloretone, than do similarly treated rats of the Wistar strain. A metabolism cage is also described which permits separation of urine and feces and convenient removal of urine collection tubes during experimental periods in which carbon dioxide is measured.

Microfilm copy of complete manuscript of 67 pages, \$1.00. Enlargements 6" x 8", 10¢ per page.

CARBOXYMETHYLATED AMINO ACIDS, PEPTIDES AND PROTEINS

Publication No. 4204)

Samuel Korman, Ph. D.
Columbia University, 1952

Part I. The Carboxymethylation of Bovine Serum Albumin.

A method for the carboxymethylation of amino acids and proteins is described. The substrate is reacted with an excess of bromoacetate buffered with solid magnesium oxide at pH 9.0-9.5 and incubated at 35° C for three days.

The extent of reaction with some functional groups of the protein has been investigated. The free amino groups, the phenolic group (of free or combined tyrosine), the imidazole group (of free or combined histidine) and the sulfhydryl groups of free cysteine are susceptible to carboxymethylation. With bovine albumin, all the free amino groups and all the phenolic groups are carboxymethylated, whereas only 60% of the imidazole groups react.

The initial rate of hydrolysis of carboxymethylated bovine albumin by trypsin is approximately half that of unreacted bovine albumin.

The carboxymethylated bovine albumin gives a very homogeneous sedimentation pattern with an $S_{20}^{2.0}$ and an apparent diffusion coefficient of 1.0×10^{-7} cm²/sec.

Part II. The Excretion of carboxymethylated Bovine Albumin.

From 13 - 19% of the carboxymethylated bovine albumin, injected into rats, was eliminated in the first 24 hour urine samples. It thus appears probable that the charge of a protein may also be a factor in its passage through the glomerular arterioles.

Part III. Preparation and Characterization of Carboxymethylated Amino Acids.

The synthesis and isolation of several of the common carboxymethylated amino acids are described. Some of the physical properties of these isolated CM amino acids are reported.

A method for the separation of the CM amino acids is proposed.

Part IV. The Use of the Carboxymethylation Reaction for the Determination of Terminal Amino Acids.

A method for the determination of the terminal amino acids of peptides is described. The peptide is carboxymethylated, precipitated with $\text{Hg}(\text{NO}_3)_2$ and then isolated as the calcium salt. The amino acids carboxymethylated at functional groups other than the $\alpha\text{-NH}_2$ group are precipitated with HgAc_2 from the hydrolysate. The terminal amino acid is then isolated with $\text{Hg}(\text{NO}_3)_2$.

The terminal amino acids of several known peptides have been determined.

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BOTANY

RACES OF *FUSARIUM OXYSPORUM* F. *LINI* IN ARIZONA

(Publication No. 4294)

Robert B. Marlatt, Ph.D.
University of Arizona, 1952

Cultures of *Fusarium oxysporum* f. *lini* obtained from wilted flax were compared to see if races of the fungus existed in Arizona. Characteristics of the *Fusarium* isolates that were compared included cultural reactions, tendency for anastomosis, ability to permeate young flax plants to their stem tips, and pathogenicity to ten flax varieties.

Thirty-four isolates were grown on four kinds of media, and those that behaved similarly on a medium were grouped. On potato-dextrose agar sixteen groups were found. When cultured on malt agar, the isolates formed twenty-one groups. Eighteen groups were obtained on cornmeal agar and seventeen on rice.

By considering the growth rates of the *Fusaria* on the four media, another type of assortment was obtained. Growth rates on potato-dextrose agar caused the isolates to fall into eleven groups. In cultures on malt agar, nineteen groups were distinguishable as compared with seven on cornmeal agar and twenty-two on rice.

None of the isolates showed a tendency to anastomose. Neither the germ tubes from one macroconidium nor those from adjacent conidia of the same isolate were seen to fuse, and in no instance was anastomosis seen to occur between hyphae of separate isolates. No antagonism was evident. Attempts were made to re-isolate the *Fusaria* from the tips of flax plants that were grown in inoculated soil for fifty days. Flax stem tips from 317 inoculated pots were cultured, and on only two occasions was a *Fusarium* obtained that could be placed in the *Elegans* section.

The pathogenicity of each isolate was determined by adding it to soil in pots in which ten flax varieties were grown. The cultures were compared as to the amount of post-emergence wilt, the number of plants which emerged, and the total surviving plants after fifty days. The reactions of the flax varieties to the isolates were graded as resistant, intermediate, or susceptible. No two isolates caused identical reactions by all ten varieties. Apparently the isolates all differed with respect to pathogenicity.

A toxic substance from a solution culture of one of the isolates was studied for its effect on seed germination of ten flax varieties. The varieties showed different amounts of inhibition of seed germination in the presence of the toxic material. Two flax varieties, which performed well on an Arizona flax-wilt plot, were least susceptible to the inhibitory effect of the toxic substance.

Sixteen of the *Fusaria* studied by Borlaug (1945) in Minnesota resembled some of the Arizona isolates. Resemblances were noted by comparing the amount of flax mortality caused by the isolates when certain varieties were grown in both regions. If the effects on a greater number of varieties could have been compared, perhaps less resemblance would have been found.

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SEASONAL RADIAL GROWTH OF SUGAR MAPLE (*ACER SACCHARUM* MARSH) AS RELATED TO CERTAIN ENVIRONMENTAL FACTORS

(Publication No. 4032)

Charles Wilson Reimer, Ph.D.
Michigan State College, 1952

The study was undertaken to learn more about the activity of the cambium of sugar maple (*Acer saccharum* Marsh), and also to determine what effect environmental factors might have on trees growing in a relatively undisturbed climax-type forest.

One hundred sugar maple trees were selected for radial growth studies in Ingham County, Michigan. Measurements covered a period of two growing seasons and were taken weekly with a dial gauge dendrometer. Three sizes were chosen; viz., 10- to 15-inch DBH (diameter at breast height), 15- to 20-inch DBH, and over-20-inch DBH.

Soil moisture at various stations in the woodlot was measured with an electrical resistance unit. Blocks were buried at the twelve-inch and thirty-six-inch levels. Soil temperature was taken at these same stations with a soil thermometer. Other environmental data were secured from a weather station located just outside of the woodlot.

All three size classes showed the same general pattern of growth. Growth began the week ending May 5, 1949, and again the week ending May 11, 1950. It appeared that the temperature of the soil and air was important in determining the time of initiation of radial growth at breast height. Since solar radiation and total hours of sunlight also increased considerably at the same time when first radial increases were recorded, it is possible that some component of light might also have had an important threshold value controlling to some extent the initiation of cambial activity.

Two periods of marked recession of the growth rate were recorded, both in 1949 and 1950. Of the environmental data considered, the indication was that, in terms of "extrinsic" control of the growth rate, total hours of sunshine were possibly both directly, and in part indirectly responsible for the occurrence of these recessions. It is also possible, however, that "intrinsic" factors controlled more directly the character of the growth pattern. In this investigation it was not possible to determine which of these two factor complexes was more important or what their interrelation might have been.

There was no definite time of cessation of cambial activity. In general, there was very little enlargement recorded after the first week in September.

Trees exposed to various borders of the forest were measured along four radii. There was no consistent pattern of eccentric growth demonstrated by trees exposed to any one border.

Total growth for 1950 was less than for 1949. This was attributed to one or a combination of three major factors: (1) seed production in 1950, no seed production of consequence in 1949; (2) fewer hours of sunshine in 1950; (3) cooler air and soil temperatures in 1950.

Soil moisture within the woodlot was, apparently, not critical at any time during the growing seasons under consideration. Available moisture near the south and west edges of the woodlot dropped to a critical level during the last few weeks of the enlargement period for all trees.

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STUDIES IN THE CHLOROCOCCALES: CHLOROCOCCUM FRIES AND OTHER SPHERICAL, ZOOSPORE-PRODUCING GENERA

(Publication No. 3977)

Richard Cawthon Starr, Ph.D.
Vanderbilt University, 1952

The need is emphasized for prolonged and periodic observation, in at least unialgal culture, of spherical members of the Chlorococcaceae, before they can be identified with certainty. The methods involved are described in some detail.

The Chlorococcacean genera *Chlorococcum*, *Macrochloris*, *Dictyococcus*, *Bracteococcus*, *Spongiochloris*, *Dictyochloris* and *Trebouxia* were studied comparatively in unialgal cultures, and the generic limits of each genus are defined in terms of zoospore type, chromatophore type in the vegetative cell and the presence or absence of a pyrenoid. Zoospores of the genera are grouped in three types, based on whether or not they round up at quiescence (presence or absence of a wall) and whether the two flagella are equal or slightly unequal. Those zoospores with walls and equal flagella are denoted as the *Chlamydomonas* type; those without walls, but with equal flagella, are called the *Protosiphon* type; those without walls and with slightly unequal flagella are called the *Bracteococcus* type.

The genus *Chlorococcum* Fries is formally emended to include only those Chlorococcacean algae with *Chlamydomonas* type zoospores, whose vegetative cells possess a chromatophore in the form of a hollow sphere and also at least one pyrenoid. Four new species of *Chlorococcum* are described, namely, *C. echinozygotum*, *C. hypnosporum*, *C. minutum* and *C. multinucleatum*. With the exception of *Chlorococcum infusum* (Schrank) Menegh. sec. Bold 1931, all other species of *Chlorococcum* are considered *nomina dubia* pending further investigation of these forms using stained and living specimens from unialgal cultures.

The genus *Macrochloris* Korshikoff is redescribed; it is delimited from similar genera by its possession of *Chlamydomonas* type zoospores and vegetative cells with an asteroid chromatophore containing a central pyrenoid. One species, *M. dissecta* Korshikoff, is described.

The genera *Dictyococcus* Gerneck and *Bracteococcus* Tereg are compared, and the generic limits of each are defined. *Dictyococcus* is delimited from other Chlorococcacean algae by its production of *Protosiphon* type zoospores and the possession of vegetative cells with a cleft protoplast, which gives the appearance of many separate polygonal chromatophores with inflected edges; pyrenoids are lacking in *Dictyococcus*. *Bracteococcus* is delimited from *Dictyococcus* and other Chlorococcacean genera by the possession of an uncleft protoplast, which possesses many separate plate-like chromatophores, and by the production of zoospores peculiar to this genus and to *Dictyochloris*; pyrenoids are lacking also in *Bracteococcus*. *Dictyococcus varians* Gerneck and *Bracteococcus minor* (Chodat) Petrova are described.

The new genus *Spongiochloris* Starr is created for those Chlorococcacean algae with *Protosiphon* type zoospores and with vegetative cells whose chromatophores are net-like in structure and possess a pyrenoid. The type species is *Spongiochloris spongiosa* (Vischer) Starr, which has a central pyrenoid lying in a fine net-like chromatophore. A second species, *S. excentrica* Starr, with an eccentric pyrenoid lying in a coarse net-like chromatophore is also described.

The genus *Dictyochloris* Vischer is validated, and the one species, *Dictyochloris fragrans* Vischer, is redescribed from transfers of the original isolation. *Dictyochloris* is delimited as a Chlorococcacean genus characterized by the production of *Bracteococcus* type zoospores and the possession of vegetative cells with a net-like chromatophore; pyrenoids are lacking in this genus.

The generic limits of the genus *Trebouxia* de Puymaly are defined in relation to other Chlorococcacean algae. *Trebouxia* is separated from similar genera by its production of *Protosiphon* type zoospores and the presence, in the vegetative cells, of an axile chromatophore with a pyrenoid.

All species of the algae reported on in this thesis are now maintained in the Culture Collection of Algae, The Botany School, Cambridge University, Cambridge, England, as well as by the writer.

Microfilm copy of complete manuscript of 146 pages, \$1.83. Enlargements 6" x 8", 10¢ per page.

DAIRY HUSBANDRY

A GENEALOGICAL ANALYSIS OF THE HOLSTEIN-FRIESIAN DAIRY HERD AT LOUISIANA STATE UNIVERSITY

(Publication No. 4133)

Woodrow Wilson Simmons, Ph.D.
University of Minnesota, 1952

A genealogical analysis was made of the Holstein-Friesian dairy herd at Louisiana State University in Baton Rouge from the time the herd was founded in 1915 through December 31, 1950.

1. The inbreeding coefficient rose from 1.00% in the original foundation animals to an average of 4.72% in the 1950 breeding group. This represents a decrease in heterozygosity of .62% per generation due to inbreeding alone.

2. The 1950 Holstein-Friesian herd is descended from twelve foundation cows and eleven bulls. Only 45.83% of the foundation cows, as compared with 91.6% of the foundation bulls, were contributors to the 1950 herd. This indicates the importance of wise selection among dairy herd sires.

3. Mastitis and breeding troubles caused approximately 24% of the herd wastage over the thirty-five year period of this study. Proper calfhood

vaccination proved an effective solution to the control of Bang's disease.

4. The dam to daughter generation interval was 5.81 years.

5. The inter se relation in the herd increased from 10.27% in 1915 to 18.20% in 1950, indicating no tendency toward family formation within the herd.

6. The calving interval was 14.08 months and the sex ratio was 50.1 males to 49.9 females. The incidence of twinning was .94%, which is much lower than that found in other dairy herd and breed studies.

7. The bull, Pabst Prilly Creator Prince (482743) was related to the 1950 herd by 24.4%; and his half sib Pabst Prilly Creator Pontiac (588584), supplied 24.8% of the heredity of the 1950 group, which is the equivalent of these two males being grandsires of the entire 1950 breeding herd. The highest related female to the breeding group was Lady Grace De Kol Johanna 2nd, which in 1930 was almost a grandmother to the entire herd. However, by 1950 this coefficient of relationship had decreased to only 3.8%. The cow family system of nomenclature used in the Louisiana State University Holstein-Friesian herd lacks genetic significance.

8. The breeding methods employed in the development of this herd of Holstein-Friesian dairy cattle did not differ greatly from those being used in most purebred herds today. There was little opportunity to practice selection among the females. This is shown by the fact that the average cow in this herd produced only 1.62 normal heifer calves. As a result of this low fertility, most breeders have concentrated their efforts on using the best sires available. The difficulties incumbent upon wise dairy sire selection have been the subject of much research in the past.

The low fertility and long generation interval are major problems confronting the breeder of dairy cattle. Greatest opportunities for future improvement seem to be in the careful selection of herd sires in the development of superior inbred lines and in the utilization of these lines in a sound and consistent outcrossing or crossbreeding program.

Microfilm copy of complete manuscript of 111 pages, \$1.39. Enlargements 6" x 8", 10¢ per page.

ENTOMOLOGY

THE OXYGEN UPTAKE OF MUSCLE HOMOGENATES FROM SEVERAL INSECTS IN THE PRESENCE OF ADDED SUCCINATE, CYTOCHROME C AND PHOSPHATE

(Publication No. 4120)

William Ross Allen, Ph.D.
University of Minnesota, 1952

The oxidation of succinate was determined in muscle homogenates of the American cockroach [*Periplaneta americana* (L.)] by measuring oxygen consumption at 30°C. in standard Warburg flasks of

approximately 15 ml. capacity. The properties of the system occurring in the leg muscle of *Periplaneta* were then compared with those in the thoracic muscles of the yellow mealworm (*Tenebrio molitor* L.) and a species of fly (*Sarcophaga bullata* Parker); the sexes and different age groups were treated separately.

Comparing the species examined, the most active system was found in muscle of the beetle *Tenebrio*. The systems in male *Periplaneta* muscle and muscle of the fly *Sarcophaga* were similar in activity. The female *Periplaneta* system was the least active one studied.

Comparing sexes, similar activities were found for male and female *Tenebrio* and *Sarcophaga*, but the activity for male *Periplaneta* was 3 to 4 times that of the female. The difference between the sexes was the same when the activity was considered as a basis of either tissue nitrogen or wet tissue weight.

Comparing ages of adults, the thoracic muscle of *Sarcophaga* showed a marked rise in succinate oxidation in the week following emergence. This increase was paralleled by an increase in muscle weight per thorax, but there was no change in the nitrogen content of the tissue; the muscle develops during the first week of adult life and presumably there is a simultaneous increase in the concentration of active enzyme. No significant change was correlated with age groups tested in *Periplaneta* and *Tenebrio*.

The present work confirms the observations of several authors who have employed different methods in a study of part or all of this system. It has been shown that the marked difference between the sexes of *Periplaneta* or differences attributed to the development of the thoracic muscles of adult Diptera are not of methodological origin, but may be observed when a manometric method alone is used. The data from *Periplaneta* and *Sarcophaga*, together with data from *Tenebrio*, demonstrate that significant differences may occur between the sexes and age groups of a species or between different insect groups.

The system of *Periplaneta* was characterized by optimal activity at a substrate concentration of 0.025 to 0.05 M; an added cytochrome c concentration of 7.5 to 10.0×10^{-6} M; a phosphate concentration of 0.025 to 0.05 M, and a pH of about 7.4. Activity was not increased by calcium or aluminum ions, singly or together. It was inhibited about 10 per cent in the male by addition of an excess of nicotinamide, and was further inhibited, to the extent of 30 per cent in the female and 45 per cent in the male, by addition of both nicotinamide and coenzyme I (DPN) in excess. Calcium ions impeded or even reversed this inhibition. Possible mechanisms of these effects were discussed. The muscle homogenate from *Periplaneta* used in the study gave values for activity almost exactly 5 times the values that were previously recorded for intact muscle fiber preparations. It was found that at least in the male, activity was greatly reduced (68 per cent) by freezing and thawing the muscle, and was not restored by the addition of excess cytochrome c to the homogenates.

Homogenates of muscle from *Tenebrio* adults showed higher activity, a broader optimal range of substrate concentration extending from 0.025 to 0.075 M, a distinct phosphate concentration optimum at 0.025 M, and required a greater cytochrome c concentration (1.5 to 3.0×10^{-5} M) than the system in *Periplaneta*. Calcium and aluminum ions were without effect. Homogenates of muscles from adult *Sarcophaga* flies responded optimally to substrate and phosphate concentrations of 0.05 M and required at least 1.5×10^{-5} M cytochrome c for saturation.

Microfilm copy of complete manuscript of 76 pages, \$1.00. Enlargements 6" x 8", 10¢ per page.

HORTICULTURE

THE HERBICIDAL ACTION OF SODIUM TRICHLOROACETATE WITH SPECIAL REFERENCE TO *TRITICUM VULGARE*

(Publication No. 4031)

Gurbachan Singh Rai, Ph.D.
Michigan State College, 1952

Sodium trichloroacetate (TCA) was applied at three rates, 15, 30 and 60 pounds per acre, to pots containing muck, clay loam and Oshtemo sand. Treatments were made 21, 42, 64 and 108 days before wheat seeds were planted. Thus it was possible to determine the effect of soil type, rate of application, and time between application and planting on growth rate and appearance of wheat seedlings.

The data recorded, fresh and dry weight of tops, dry weight of roots and periodic rate of growth of plants, showed that the crop injury was in proportion to the amounts of TCA application. The greatest suppression of growth resulted when TCA was applied 21 days before the sowing date of the wheat seeds. The other dates of application, 42, 64 and 108 days (the time elapsed between the application and sowing date) produced less injurious results. This was true for sandy and clay loam soils. The observations indicated that the sandy soil was the first to show the dissipation of the herbicide. Next in order was clay loam soil and finally the muck. The residual effect of TCA was noticed on muck soil even after 108 days. On both soils, sandy and clay loam, the dissipation was complete by the end of 64 day period.

Chemical analysis showed that the plants treated with TCA contained a larger percentage of protein, arginine, reducing sugar and acid hydrolyzable polysaccharide. A decrease was observed in the percentage of non-reducing sugar, ether extract and unsaponifiable material. The root tissue showed a slight increase in the percentage of proteins, amino acids, reducing sugars and starch. Little difference was noted in the other amino acids (expressed as percentage of crude protein), with the exception of histidine, and in the percentage of non-reducing sugars and ether extract.

The samples of treated soil, obtained after every 2 weeks or so during the entire period of the experiment, did not indicate any change in pH, available nitrate nitrogen, phosphorus, potassium, calcium, magnesium, nitrite nitrogen and ammonia content of the soils.

The data indicated that the death of TCA injured plants was due to metabolic changes resulting from the soil application of the herbicide.

Microfilm copy of complete manuscript of 74 pages, \$1.00. Enlargements 6" x 8", 10¢ per page.

MEDICINE AND SURGERY

STUDIES ON THE METABOLISM OF IRON

(Publication No. 4126)

Robert Bruce Howard, Ph.D.
University of Minnesota, 1952

The literature concerning certain phases of iron metabolism has been reviewed. Significant articles concerning the nature of serum iron, its function, and its regulation have been discussed in some detail. Particularly those studies relating to the variation of serum iron in a given individual were reviewed. The distribution of iron within the body was considered, and emphasis was placed on the liver as a site of iron storage. The experiences of other investigators with regard to serum iron levels in various forms of liver and biliary tract disease were reported.

Methods for the determination of serum iron and tissue iron were reported in detail and evaluated for accuracy.

The serum iron was determined in 56 normal individuals, and a mean value of 119.1 ± 38 micrograms per cent. was found. In this study there was no significant difference between males and females as far as serum iron was concerned.

Certain studies on the diurnal variation in the serum iron level were carried out. It was determined that there was no consistent relationship between serum iron levels and eosinophile levels suggesting that the adrenal cortex does not play a significant role in the determination of serum iron. A constant temperature environment did not alter the diurnal rhythm of serum iron when compared with that obtained in subjects in a normal environmental situation. Dietary factors did, however, appear to influence significantly the daily pattern of serum iron. The ingestion of four isocaloric meals at six-hour intervals apparently caused the peak serum iron value to occur six to eight hours later than is the case in subjects ingesting the standard three meals in a 24-hour period. Two patients with Addison's disease showed normal diurnal serum iron rhythms whereas two patients with panhypopituitarism showed relatively flat curves.

Serum iron determinations were made on one or more occasions in each of 70 cases with various types of diffuse liver disease and in 15 patients with extra-hepatic biliary obstruction. Patients with "alcoholic cirrhosis" tended to have low values for serum iron except when their situation was unfavorable clinically. Acute hepatitis, on the other hand, was usually characterized by hyperferremia at sometime during its course. Both of these groups of patients showed significant differences from the normal with regard to serum iron levels. Patients with post-infectious cirrhosis showed a tendency to have values for serum iron slightly higher than normal, but this difference was not significant. This group, however, did show a significant difference from the "alcoholic" group, constituting additional evidence that post-infectious cirrhosis is an entity which differs from the more familiar "alcoholic," primarily fatty cirrhosis.

Certain experimental studies were carried out with two objectives: a. the reproduction of the hyperferremia of acute liver damage in laboratory animals and b. if successful in the latter, clarification of the mechanism of the production of the hyperferremia. Acute liver injury was induced in dogs and in rats by means of exposure to carbon tetrachloride, and chronic liver damage was induced in rats by means of a choline-deficient diet. These studies were inconclusive. The rat, particularly, proved to be an unsatisfactory experimental animal for the study of iron metabolism.

Two cases of hemochromatosis were reported in some detail. Both showed extreme degrees of hyperferremia, and in one of these patients this was not a terminal event. The second patient was, and is still being, subjected to repeated phlebotomy as a therapeutic measure with apparent clinical improvement. In this patient it was also possible to demonstrate an increased absorption of iron from the gastro-intestinal tract despite the presence of large amounts of iron in storage sites.

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PHARMACOLOGY

CHEMICAL CONSTITUTION AND ANALGETIC ACTION

(Publication No. 4106)

Myron Bernstein Slomka, Ph.D.
State University of Iowa, 1952

The following new compounds were synthesized and tested for analgetic action in the rat using the D'Amour and Smith technique:¹ N-(3,3-diphenyl-3-acetoxy-propyl) morpholine HCl, N-(3-phenyl-3-acetoxy-butyl) morpholine HCl, N-acetonylmethyl ephedrine HCl, N-phenacylmethyl ephedrine HCl, N-acetonylmethyl ephedrine methiodide,

N-phenacylmethyl ephedrine methiodide, N-acetonylethyl-O-acetyl ephedrine HCl, N-(3-acetoxy-butyl)-O-acetyl ephedrine HCl, 1-phenyl-1-acetoxy-2-morpholinomethyl cyclohexane HCl, N-methyl-N-(2-acetoxy-ethyl)-2-phenyl-1-methyl-ethyl amine HCl, N-methyl-N-(2-acetoxyethyl)-2-phenyl-2-methyl-ethyl amine HCl, N-methyl-N-(3-acetoxypentyl)-2-phenyl-2-methyl-ethyl amine HCl, N-(2-acetoxyethyl)-1,2,2,4-tetrahydroisoquinoline HCl, N-(2-acetoxyethyl)-isoquinolinium bromide, 1-phenyl-1-acetoxy-2-dimethylaminomethyl cyclohexane HCl, 1-phenyl-1-acetoxy-2-diethylaminomethyl cyclohexane HCl, N-phenacyl-N,N-dimethyl-N-(2-hydroxypropyl) ammonium bromide, N-phenacyl-N,N-diethyl-N-(2-hydroxyethyl) ammonium bromide, N-phenacyl-N-methyl morpholinium bromide, N-phenacyl-p-(γ -hydroxypropyl) pyridinium bromide.

Thirteen of the above were tested for their effect on the isolated rabbit ileum and the effect of five of these on the circulatory system of the intact anesthetized cat was determined.

Some aspects of the relationship of chemical constitution to analgetic action are discussed.

The results of this investigation warrant a re-statement of the working hypothesis of Schueler et al. regarding chemical constitution and analgetic action as follows: The presence of both a sympathomimetic moiety and a parasympathomimetic moiety within the same molecule is an expression of the necessary chemical constitutional requirements for the morphine-type analgetics, although these moieties in themselves may not always be sufficient to confer analgetic action on the molecule.

1. The compounds that are underlined showed some degree of analgetic action.

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PHARMACY

THE EFFECT OF CERTAIN NON-IONIC WETTING AGENTS IN EXTRACTION OF ALKALOIDAL DRUGS

(Publication No. 4052)

Wanda J. Butler, Ph.D.
State University of Iowa, 1952

An investigation to determine the effect of certain non-ionic surface active agents on alkaloid extraction, with the use of official procedures for the preparation of fluidextracts.

Procedures were carried out using Belladonna, Hyoscyamus, Ipecac and Cinchona, and the reserve portion of each fluidextract was collected for assay. Each drug was extracted with the menstruum official for it, and then with menstrua containing surface

active agents. The surface active agents employed were all laurate esters including Polyethylene Glycol 400 Monolaurate, Polyethylene Glycol 400 Dilaurate, Polyethylene Glycol 600 Monolaurate, Propylene Glycol Monolaurate, Glycerol Sorbitan Laurate, Polyoxyethylene Sorbitan Monolaurate and Sorbitan Monolaurate.

The assay methods used in this study were modified from the official methods so that less time was consumed in assaying. The modification was in respect to the separation of the alkaloids from the fluidextract. The spectrophotometer was employed in assaying Cinchona Fluidextract.

The results in this study indicated that a larger amount of alkaloids can be extracted through the use of such wetting agents. In each case the assays were compared to controls, and it was concluded that the presence of the surface active agents allows a more complete removal of the alkaloids.

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PHYSIOLOGY

CHANGES IN BLOOD FLOW, ARTERIAL PRESSURE AND CARDIAC RATE ASSOCIATED WITH EXPERIMENTAL CONCUSSION AND ELECTROCONVULSIVE SHOCK

(Publication No. 4050)

George Wallace Brown, Ph.D.
State University of Iowa, 1952

One hundred and seventy dogs, sixteen monkeys and fifteen humans have been the subjects of an investigation to determine the cerebral blood flow, arterial blood pressure and cardiac rate responses to experimental concussion and electroconvulsive shock.

It was found that, for the purpose of this investigation, experimental concussion could be described as the condition, following a controlled head blow, in which abolition of the corneal reflex and a respiratory arrest occurred, in the absence of discernable brain damage.

The cardiovascular response of dogs to head blows of varying intensity was a short-lasting elevation in common carotid blood flow and in arterial blood pressure. Within ten minutes both blood flow and blood pressure had returned to control levels or lower. Accompanying this response was the development of a cardiac arrhythmia which might continue for as long as twenty minutes post-blow. Double vagotomies prevented the development of this arrhythmia. During the time of maximum elevation of carotid blood flow and arterial pressure there was a sharp diminution of blood flow in the femoral artery, indicating that, following a blow to the head of a dog, there was an intense peripheral vasoconstriction corresponding in time span to the increase in common

carotid blood flow. Except for an initial decrease for one second in common carotid blood flow and arterial blood pressure in response to electroconvulsive shock, the cardiovascular response pattern was identical to that obtained after the delivery of head blows of varying intensity.

The cardiovascular pattern exhibited in dogs as a response to experimental concussion and electroconvulsive shock was verified in monkeys, in two series of experiments in which blood flow was measured in the internal carotid artery. Since the monkey does not have the 'rete mirabile' system which exists in the cerebral structure of the dog, the internal carotid blood flow indicated the cerebral blood flow pattern, following these stimuli. Thus, subsequent to either a concussive blow or an electroshock stimulus, cerebral blood flow exhibited a short-lasting, marked elevation which duplicated the pressure changes occurring simultaneously.

A series of 21 experiments on psychotic patients revealed patterns of blood pressure response to electroconvulsive therapy similar to the patterns observed in the animals of this study, in response to both electroconvulsive shock and concussion.

In summation, the evidence of this study indicates that the immediate response to experimental concussion in both the dog and monkey is a short-lasting, marked elevation in systemic blood pressure accompanied by vasoconstriction in the periphery. From the time course of events, this response would seem to be neuronal rather than hormonal in nature. The elevation in systemic arterial pressure is thought to produce a passive increase in cerebral blood flow. Concomitant with this response is the occurrence of a cardiac arrhythmia which can be abolished by sectioning the vagi.

As a result of the series of studies with electroconvulsive shock applied to dogs, monkeys and man, it is reasonable to assume that the observed cardiovascular response is non-specific in nature, since the response can also be evoked by an experimental concussion.

No blood flow measurements in man were made. However, it has been observed that the arterial pressure and cardiac rate response to electroconvulsive shock in man is similar to that observed in dogs and monkeys under similar conditions. Therefore, unless a different relationship between blood flow and blood pressure can be demonstrated in man, than exists in dogs and monkeys, the cerebral blood flow response in man, following electroconvulsive shock, and probably concussion, should be the same as that reported for dogs and monkeys.

Microfilm copy of complete manuscript of 337 pages, \$1.71. Enlargements 6" x 8", 10¢ per page.

THE EFFECTS OF ALTITUDE UPON COLONIC ACTIVITY AND FLATUS COMPOSITION OF MAN

(Publication No. 3994)

William Clarence Clark, Ph.D.
University of Illinois, 1952

It is reported that about five percent of subjects who ascend rapidly to high altitudes suffer severe abdominal gas pains and must descend to a lower altitude for relief. These severe symptoms are reported to be associated with the presence of gas pockets in the lower ileum and upper colon. The incidence and severity of these symptoms have been related to the proportions of carbohydrate, fat and protein in the diet.

In the literature reviewed, however, no data were available concerning colonic tone and activity pressures or the composition and volume of flatus collectable at high altitudes. Also, no data were found concerning the role of fermentation on the composition of flatus at altitude, or the effects of undigestible food residues. Furthermore, no study was found in which the time required for a gas to pass from the stomach into the lower colon had been determined. The object of this investigation was the collection of data on the above mentioned problems as a basis for a better comprehension of the factors and mechanisms involved in the development of these painful symptoms.

The problem was studied by using several different experimental approaches. Undiluted flatus was collected at ground level and at several intervals during ascent to a simulated altitude of 35,000 feet, determining the carbon dioxide and oxygen content as well as the volume of collectable flatus. Another series of experiments was performed in which 300 cc. of air was injected into the colon at ground level (758 ft.) and retained for a specified time at ground level and at simulated altitudes of 12,000 and 25,000 feet. The flatus was collected, measured, and analyzed for carbon dioxide and oxygen.

Similar experiments were performed with the ingestion of water or milk during ascent to altitude. Subjects under sulfathalidine medication were taken to simulated altitude of 25,000 feet in a similar study.

The effects of a low residue diet were studied by administering one liter of oxygen into the stomach of subjects and then collecting frequent samples of flatus and comparing their content of carbon dioxide, oxygen and volume with similar flatus samples collected under the same experimental conditions, except that the subjects were on a normal mixed diet.

The data collected in this investigation resulted in the following conclusions:

Normal human flatus collected at ground level usually contained carbon dioxide at partial pressures greater than normal mixed venous blood.

Colonic activity increased with ascent to altitude under experimental conditions.

The carbon dioxide content of collectable flatus increased with altitude; it accounted for an increasing proportion of the total gas collected at higher altitudes.

Ingestion of water and milk during ascent to altitude resulted in an increased content of carbon dioxide and an increased volume of collectable flatus.

Distention of the gastrointestinal tract by an increased volume of undigested food residues associated with the normal mixed diet resulted in a more rapid transport of a gas (oxygen) from the stomach to the lower colon. These larger food residues resulted in an increased carbon dioxide content of the flatus that may be explained by a more rapid passage of the gas, and by the presence of these residues interfering with absorption of carbon dioxide. The high concentration of carbon dioxide is depressing to intestinal activity and the resulting failure of propulsive motility permits the development of the painful symptoms.

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STUDIES ON THE EFFECTS OF ADRENALECTOMY AND OF CORTISONE ON ANAPHYLAXIS AND RELATED PHENOMENA

(Publication No. 4135)

Peter Booth Dews, Ph.D.
University of Minnesota, 1952

It has been reported in the literature that adrenalectomy greatly increases the sensitivity of guinea pigs, rats and mice to anaphylaxis; also that administration of cortisone during the period of sensitization greatly inhibits the development of local anaphylactic sensitivity and the development of circulating antibodies in rabbits. It has also been reported that no effect of cortisone on anaphylaxis in guinea pigs could be detected.

In the present work, adrenalectomy has been found to greatly increase the susceptibility of rats to anaphylaxis. As a result of the sensitizing and challenging injections, 70 per cent of the adrenalectomized rats, but none of the intact rats, died. The symptoms of the anaphylactic reaction were much more severe in the adrenalectomized animals. The commonest symptoms were difficulty in breathing and weakness. Some of the adrenalectomized animals showed a violent reaction consisting of scratching and biting at a place in the flank and clonic squirming convulsions with arrest of respiration.

A system of scoring has been devised to estimate quantitatively the severity of the anaphylactic reaction in rats. Using this system it has been found that rats sensitized prior to adrenalectomy had subsequently less severe anaphylactic reactions than rats sensitized after adrenalectomy. The administration of cortisone to adrenalectomized sensitized rats prior to shocking was found to prevent mortality without having any detectable effect on the severity of the reaction. The administration of cortisone to adrenalectomized rats at the time of

sensitization led to great reduction in both the severity and mortality of the subsequently elicited anaphylactic reaction.

The effect of cortisone administration concurrently with daily intracutaneous antigen injections was studied in intact and adrenalectomized rabbits on the development of the active Arthus reaction and on circulating antibody concentrations. The antibodies were measured by the quantitative precipitin method. The cortisone treated rabbits whether intact or adrenalectomized showed much milder Arthus reactions and much lower antibody concentrations than untreated rabbits. The adrenalectomized rabbits showed some tendency to develop more severe local reactions.

The effect of adrenalectomy and of administration of cortisone on the concentration of immune hemolysins in rats was then studied. The hemolysin titers were determined by adding constant amounts of washed red cells to serial dilutions of plasma in the presence of added complement. The extent of hemolysis was estimated from the light absorption of the supernatant after centrifugation with a spectrophotometer. No consistent difference between the titers produced in intact and adrenalectomized animals was detected. Administration of cortisone during the time of immunization to foreign red cells, slightly reduced the resulting titer of hemolysins in both intact and adrenalectomized rats.

The administration of foreign red cells to guinea pigs during cortisone treatment led to the development of similar hemolysin titers to those found in guinea pigs immunized in the absence of cortisone.

In summary, cortisone reduces the development of local anaphylactic sensitivity in rabbits. The evidence available suggests that this is due to a reduction in the concentration of circulating antibodies. Adrenalectomy increases the development of anaphylactic sensitivity in rats; cortisone administration inhibits the development of anaphylactic sensitivity in adrenalectomized rats. Although cortisone slightly reduces circulating antibody concentrations in rats, it is suggested that this action cannot account for more than a small part of the effect on development of anaphylactic sensitivity.

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STUDIES ON THE GASTRIC SECRETORY DEPRESSANT IN CANINE GASTRIC JUICE

(Publication No. 4125)

Robert Thurlow Hood, Jr., Ph.D.
University of Minnesota, 1952

An experimental investigation was carried out on dogs to study the nature of the gastric secretory depressant in gastric juice, a factor first described by Brunswick and associates and further elucidated by Code and associates. Experiments were designed, first, to detect the region of the stomach from which

the depressant factor originates, and secondly, to determine the effect of vagal denervation on the elaboration of the depressant factor.

In the first phase of the study, the depressant capacity of gastric juice secreted by the mucosa of the gastric fundus was compared with that from the mucosa of the gastric antrum. Dogs were prepared with pouches of the Heidenhain type derived from the fundus of the stomach. In other dogs, the antrum was separated from the rest of the stomach and formed into pouches. Gastric juice was collected from these pouches over a 5 hour period during stimulation with urecholine administered subcutaneously at 10 minute intervals in doses varying between 0.1 and 0.15 mg. Collections were also made throughout the 24 hour period following the ingestion of 200 gm. of raw meat. One hundred milligram amounts of the dried alcoholic precipitates of these collections were examined for depressant activity by intravenous injection into dogs with Heidenhain pouches secreting at constant rates in response to repeated injections of histamine, according to the method of Code and associates. Gastric juice secreted by the antrum was found to constantly possess strong inhibitory activity while juice from the fundus lacked this capacity. The degree of the depressant activity was unaffected by the choice of the gastric secretory stimulant.

In the second phase of the study, the effect of vagal denervation on the elaboration of the depressant by the gastric mucosa was tested. Dogs were prepared with vagally innervated gastric pouches according to the method of Hollander and Jemerin. These pouches were derived principally from the fundus although they all contained small portions of the antrum. Collections were made from these pouches secreting in response to both urecholine and meat stimulation and the depressant activity determined. Subsequently, at a second operation, the vagal innervation was severed by separation of the pouches from the stomachs without disturbing the mucosal lining of the pouches. Identical secretory studies were repeated. Characteristically, the secretion from the vagally innervated pouches possessed depressant activity while that from the pouches after their separation from the stomachs did not. The secretory depressant activity of the juice, secreted in response to urecholine and meat stimulation, was found to be similarly reduced.

The actual mechanism of the depressant effect of gastric juice on hydrochloric acid secretion remains obscure. Some evidence of a generalized toxicity to the injection of gastric juice, as evidenced by the development of pallor, weakness, emesis or fever, was frequently observed. The close association of emesis and fever with the depression of gastric secretion is a well established experimental and clinical observation. However, a careful analysis of the incidence and degree of these manifestations indicated that their effect alone was insufficient to explain the reduction in secretion. To this extent the possibility of a direct depressant effect of gastric juice on the secretory mechanism exists.

It is concluded that the gastric secretory

depressant factor of canine juice is secreted by the mucosa of the gastric antrum and its release from the mucosa is reduced by vagal denervation.

Microfilm copy of complete manuscript of 97 pages, \$1.21. Enlargements 6" x 8", 10¢ per page.

STUDIES ON THE MODE OF ACTION OF THYROXINE

(Publication No. 4082)

Harry J. Lipner, Ph.D.
State University of Iowa, 1952

Investigations at the subcellular level, aiming at elucidation of the mechanism of action of thyroxine were carried out along two lines.

The liver succinoxidase system, under the conditions of these experiments, may be considered to reflect succinic dehydrogenase activity. The time response curve for this system was determined in both homogenized liver and various liver cell fractions from thyroidectomized rats sacrificed 12 to 96 hours following a massive dose of thyroxine. It was found in confirmation of previous work by others, that the greater part of the succinoxidase activity is associated with the mitochondrial fraction of the liver cells. It was further observed that the succinic dehydrogenase activity lags behind the metabolism of liver slices in the response of the liver to thyroxine. The results suggest that succinic dehydrogenase is not an initiating factor in the response of liver oxidative mechanisms to thyroxine.

The distribution of thyroxine among the liver cell fractions was investigated following the administration of massive doses of thyroxine labeled with I^{131} or with C^{14} . No preferential concentration of radioactivity in any of the liver cell fractions was encountered even though the oxidative responses of the cell were largely limited to the mitochondrial fraction. The distribution of thyroxine within the cell does not appear to be related to available data on the localization of the cellular oxidative responses to the hormone.

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EXCITATION OF SINGLE STRIATED MUSCLE FIBERS

(Publication No. 4008)

Julius Praglin, Ph.D.
University of Illinois, 1952

The strength-duration curves of single, striated, muscle fibers of the frog semitendinosus and sartorius were investigated with square-wave stimuli in the range of 30 microseconds to 1000 milliseconds. The electrical responses of single fibers were

recorded in oil from the surface of the muscle by means of 25 micron platinum-wire electrodes. Mechanical responses were observed in single uninjured fibers isolated from the semitendinosus muscle and stimulated in physiological salt solution. Strength-duration curves of isolated fibers stimulated in solution show a curve which displays an α and a γ branch. Under curarization, the γ branch disappears and the excitation constant (Hill's K) of the α branch shortens from about 10 to 3 milliseconds. The γ branch has a K value of about 0.3 milliseconds. This is not significantly different from the excitation constant of the motor nerve. Stimulation under oil with small electrodes (0.13 mm. in diameter) yields an excitation constant for muscle of about 0.15 milliseconds which is not different statistically from the motor nerve excitation constant. Curare does not change this value significantly nor does it abolish a further discontinuity which occurs at very short durations (60 to 80 microseconds) in about 50 percent of the experiments. This discontinuity has been shown to have a seasonal variation — present in almost all experiments in the fall, disappearing gradually towards late winter and reappearing in the late spring. The initial part of this discontinuity may be a manifestation of Lucas' β excitability and has a K value of 30 to 80 microseconds. The measurement of excitability during a sub-threshold conditioning pulse by testing shocks applied at variable intervals after the onset of the conditioning pulse demonstrated that there is a rather abrupt rise of the local potential in the same range of times at which the discontinuity in the strength-duration curve occurs. It is concluded that the β excitability of the strength-duration curve corresponds to the charging of the membrane's passive electrical components while the α excitability involves the growth of the impulse to a propagated response with the aid of the local potential. These measurements have further shown that the rise of the local potential in denervated preparations is much more rapid than the rise of the local potential in curarized preparations. This is probably a manifestation of super-sensitivity in denervated structures.

The utilization time for excitation measured by small electrodes has been found to be about 2.1 milliseconds for the sartorius and semitendinosus. These values employed in Hill's or Rashevsky's complete expressions for excitation and accommodation together with the above mentioned excitation constant of 0.15 milliseconds, show that Hill's theory fails to predict the value of the utilization time and that Rashevsky's theory predicts erroneously that there is no accommodation. Hill's theory further predicts a deviation from the exponential strength-duration curve with excitation and accommodation constants as found experimentally. Nevertheless, it has been found that the exponential relationship is followed very well by the experimental data of this investigation. Rashevsky's theory predicts a perfectly exponential strength-duration curve and in this respect is superficially in accord with the facts. Blair's constant C has been

shown to be not statistically significant in these experiments.

Microfilm copy of complete manuscript of 166 pages, \$2.08. Enlargements 6" x 8", 10¢ per page.

STUDIES ON THE ABSORPTION AND EXCRETION OF CHOLINE IN THE ALBINO RAT

(Publication No. 4100)

Carl Clement Riedesel, Ph.D.
State University of Iowa, 1952

Choline has been recognized as a distinct organic compound for nearly one hundred years, but only within the past two decades has its true importance in metabolism been established. Because of its ability to prevent or lessen the severity of certain types of fatty infiltration of the liver, it has been designated as a lipotropic substance. Along with the recognition of its lipotropic activity has come an increasing use of choline in the treatment of hepatic dysfunction.

The two most generally used methods of choline administration are the oral and intravenous methods. It has been found that following oral administration of choline, normal subjects excrete, along with some choline, increased quantities of trimethylamine in the urine, whereas following intravenous administration of choline, more choline is excreted and less trimethylamine. In subjects with hepato-biliary disease, oral administration of choline results in greater quantities of choline excreted. Several workers suggest a change in flora to explain excretion. Since no information was available as to the rate of choline absorption from the intestine, or on the factors which might modify the absorption and subsequent excretion, this series of studies was undertaken.

When choline chloride was administered at a dose of 200 milligrams per kilogram of body weight, the absorption rate from the small intestine was found to be approximately 4 milligrams per 100 grams body weight, per hour.

Incubation of choline with an intestinal homogenate, for 2 hours, did not result in any appreciable decrease in choline concentration. When the intestinal bacteria were suppressed *in vivo* with a mixture of aureomycin-sulfaguanidine in the diet, the same quantities of choline disappeared from the small intestine as in the controls. This was taken to indicate that intestinal bacteria play only a minor role in the metabolism of ingested choline.

The rate of choline absorption was increased following either thyroidectomy, administration of a hepatotoxin or bile duct ligation.

In rats with ligated bile ducts, the administration of rat bile with the injected choline did not lower the absorption rate to its normal rate in controls. Administration of either ox bile or bile salts with the choline given to rats with ligated bile ducts tended to increase the rate over that seen in ligated controls.

Following bile duct ligation and hepatic injury

with carbon tetrachloride the amounts of choline excreted in the urine were increased over that observed in controls.

The possible relationships between the several factors causing an increased rate of absorption are discussed, and literature is cited in support of a supposition that the varying ratios of choline and trimethylamine appearing in the urine are a reflection of choline metabolism by the liver, rather than by intestinal bacteria.

Microfilm copy of complete manuscript of 117 pages, \$1.46. Enlargements 6" x 8", 10¢ per page.

PSYCHOLOGY

A STUDY OF ERGIC TENSION PATTERNS THROUGH THE EFFECTS OF WATER DEPRIVATION IN HUMANS

(Publication No. 3988)

Marvin Adelson, Ph.D.
University of Illinois, 1952

This study is an attempt to investigate the effects of primary drive in humans. Exception is taken to the point of view that such investigations are impracticable, although the difficulties inherent in them are recognized. These include a) design difficulties, including the problem of controlling extraneous influences, and b) the lack of a background of studies yielding methodological and factual sophistication.

This investigation aims at resolving some of these problems. Water deprivation is the independent variable, chosen for ease of control. Eight subjects were divided into two groups of four each at random, each group being deprived of water during one experimental session and free to drink *ad libitum* during the other. The sessions consisted of the two thirty-six hour periods from 8 a.m. Saturday through 8 p.m. Sunday on the two successive weekends of the 21st and 28th of April, 1951. The first twenty-four hours of each weekend were spent in inducing the deprivation state only, no measurement being taken during this time. During the final twelve hours of each session, repeated measurements (from five to seven) were taken for each subject on some fifty variables thought to be related to water deprivation. The items were divided up, for purposes of administration, into seven groups, each group being taken by one or more experimenters at a separate station in the experimental building. The subjects moved from one station to another throughout the day so that repeated measurements could be taken.

The list of variables on which measures were obtained is divided into three parts. The first of these includes those variables differences in the means of which were significant under the median test at the

.028 level. Variables not showing significance are listed as "Almost Significant" or "Not Significant" arbitrarily, depending upon whether differences between means showed one or two reversals, respectively.

Significant

- (-) Body weight and percent change
- (+) Body mouth temperature
- (+) Finger surface temperature
- (+) Subjective thirst as measured by questionnaire
- (+) Subjective discomfort as measured by questionnaire
- (+) Estimate of "immediate drinking if permitted"
- (+) Systolic blood pressure
- (+) Diastolic blood pressure
- (+) Pulse rate
- (-) Saliva secretion
- (-) Urine volume, cumulated after initial evacuation
- (-) Urine pH
- (+) Critical flicker fusion frequency
- (+) Threshold of flicker from flicker to steady
- (+) Ratio of uncertainty interval to CFFF.
- (-) Average PGR deflection to picture stimuli, expressed as a proportion of initial resistance
- (+) Number of returns to stimulus word in association task
- (-) Number of trials necessary to relearn mental mazes.

Almost Significant

- (-) Average distance of all starts from the goal in the impossible maze
- (+) No. of runs of increasing and decreasing distance of entry from goal in impossible maze
- (+) Maximum distance of any starting point from the goal in impossible maze.
- (-) Trials to learn mental mazes to criterion
- (-) Errors in learning mental mazes
- (-) Errors in relearning mental mazes
- (-) Savings (errors) in mental mazes
- (-) Savings (trials) in mental mazes
- (-) Total number of cancellations
- (+) Flicker uncertainty interval
- (+) Total reversals of reversible cube
- (+) Reversals in middle thirty-second interval
- (+) Total number of associations given to stimulus word
- (+) Ratio of number of .01" exposures of water-related to neutral, and to all words, for recognition
- (+) Number of water-related identifications given to tachistoscopically presented neutral pictures

Not Significant

Estimated drinking in next half hour
 Total distance of all starts from the goal in impossible maze
 Total number of starts in impossible maze
 Number of changes of starting point in impossible maze
 Ratio of number of changes of starting point to total number of starts in impossible maze
 Errors in cancellation
 Errors plus sloppy cancellations
 Ratio of errors plus sloppy cancellations to total cancellations
 Total number of acceptable cancellations
 Fluency: number of words written in allotted time
 Initial skin resistance
 Variance of PGR deflections about own mean
 Threshold of flicker from flicker to steady
 Respiration rate
 Percent savings in trials to learn mental mazes
 Percent changes in body weight without reference to algebraic sign

The algebraic sign in parentheses preceding the name of a variable indicates the direction in which deprivation caused the scores to vary.

Some interpretations are given for these results and some conclusions reached on the basis of them. Recommendations are made to guide future workers, and a number of hypotheses suggestive of additional experimentation are derived from the data. An appendix presenting representative data in graphic form is included.

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THE EFFECT OF DIFFICULTY OF TASK ON PROACTIVE FACILITATION AND INTERFERENCE

(Publication No. 4043)

Abram Moses Barch, Ph.D.
State University of Iowa, 1952

The purpose of this study was to compare the amount of transfer between two motor tasks that were complete reversals of each other when the relative difficulty of the initial task was manipulated by changing the size of the target and when the two motor tasks were fractional reversals of each other with a similar manipulation of task difficulty. A secondary purpose was to isolate the factors that would lead to an increase in errors in an unchanged portion of a complex motor task when some other portion underwent a reversal of stimulus-response relations.

Five groups of female college students, fourteen per group, participated in the experiment. During the initial task on the Two-Hand Coordinator, two of

the groups practiced with the 6/8 inch or large sized target (Groups L-D and PL-S), two groups practiced with the 1/8 inch or small sized target (Groups S-S and PS-S), and one group practiced with the 3/8 inch or medium sized target (Group M-S). After thirty trials of initial practice, both controls were reversed (Task B) for large, medium, and small sized target groups (Groups L-S, M-S, and S-S), and one control (the left hand one) was reversed (Task C) for large and small sized target groups (Groups PL-S and PS-S). All groups practiced with the small sized target on the transfer tasks.

Use of different target sizes during initial practice led to tasks of differing difficulty. Group S-S performed significantly better than Groups M-S and L-S in mean time on target score on the first trial of Task B. Group PS-S performed significantly better than Group PL-S in mean time on target score and mean total error score for the entire twenty trials of Task C. Both the stationary and movement errors of the right hand control increased significantly when the left hand control was reversed.

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SOME RELATIONS BETWEEN TECHNIQUES OF FEEDING AND TRAINING DURING INFANCY AND CERTAIN BEHAVIOR IN CHILDHOOD

(Publication No. 4158)

Arnold Bernstein, Ph.D.
Columbia University, 1952

The purpose of the study was to examine certain relations between infant experiences and behavior in later childhood, particularly the effects of the methods of feeding and training employed during infancy.

Problem

An empirical test of the general hypothesis that experience during infancy produces demonstrable behavioral consequences in later life was undertaken. Two subordinate hypotheses derived from the psychoanalytic theory of psychosexual development was tested: (1) oral reinforcement during infancy will affect behavior in later childhood, and (2) coerciveness of bowel training during infancy will affect behavior in later childhood.

Subjects

Fifty children between 47 and 68 months of age were selected at random from the current files of a well-baby clinic. Each child had attended the clinic since shortly after birth.

Procedure

Data were gathered from three sources: (1) a play interview with the child, (2) an interview with the mother, and (3) medical records of the well-baby clinic. Data obtained from the mother were checked against the medical records whenever possible.

Data

With regard to each child, data were gathered on: (1) the amount of sucking reinforcement experienced during infancy, (2) the date and method of bowel training, (3) constipation, (4) response to weaning, (5) propensity to collect things, (6) fingersucking, (7) responses to requests by experimenter, i.e., to separate from the mother, to play with dolls, to draw a person, to play with finger paints, to play with cold cream, and to accept a piece of candy.

Results

(1) The hypothesis that reinforcement increases the strength of oral drive during infancy was supported by the findings. (2) The hypothesis that thumbsucking is due to sucking deprivation during infancy was not supported. (3) The possibility that thumbsucking may, in part, be due to reinforcement of oral drive during infancy was suggested by the findings. (4) Using a food choice under controlled conditions, it was demonstrated that the selection of the sucking choice during childhood bore a significant relationship to the amount of sucking reinforcement in infancy. (5) A relationship was found between the amount of sucking reinforcement during infancy and the tendency to be constipated. (6) An inverse relationship was found between the amount of sucking reinforcement during infancy and the tendency to collect objects in later childhood. (7) The psychoanalytic hypothesis that the propensity to collect objects is directly related to constipation was rejected. (8) Using four-fold contingency tables, it was found that relationship significant at the .05 level existed between coercive toilet training and separation anxiety, negativistic behavior, uncommunicativeness, and immaturity in the experimental play interview. (9) No relationship was found between coercive toilet training and collecting, constipation, or response to smearing tests.

Discussion

The conclusions are somewhat limited by the undetermined reliabilities of many of the variables. However, as a general rule, lower reliabilities tend to obscure rather than magnify the true differences between groups. Therefore, somewhat more confidence may be placed in the positive findings of the present study than in the negative findings.

It must also be emphasized that the findings of the present study pertain to the general effect of certain variables upon group averages in the long run. The findings therefore cannot be used to predict behavior in individual cases. Not only was there considerable overlap between the different groups, but the level of statistical significance of the observed differences clearly indicated the existence of other important variables which were not considered in the present study.

Conclusions

While many questions remain unanswered, the results indicate that psychoanalytic speculations regarding the importance of the oral and anal experiences of the infant are a rich source hypotheses

deserving careful study and consideration. The findings also offer evidence that *a priori* assumptions about the specific consequences of infantile experiences are to be received with considerable caution. In principle, the assertion that infantile experiences have demonstrable effects in later life has been verified.

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THE ACQUISITION AND TRANSFER OF RESPONSE TENDENCIES LEARNED WITHOUT REPORTED AWARENESS

(Publication No. 4047)

Joseph David Birch, Ph.D.
State University of Iowa, 1952

This experiment was designed to test the hypothesis that, under conditions of learning without reported awareness, certain discrimination learning phenomena in articulate organisms could be accounted for by the discrimination learning theories devised by Spence and Hull for specified non-articulate organisms.

To test this hypothesis two groups of sixty subjects each were given differential numbers of reinforced approaching responses to certain stimulus patterns on a training task and tested under two conditions. Seven "conflict" test trials, administered periodically throughout training, for each of four stimulus arrangements served as one test condition while the second test condition consisted of a transfer task presented immediately upon completion of the training task. The differences between the frequency of correct choice for the two groups on the two test conditions were compared with the theoretical expectations.

The results of the analyses of the data, totalled over the four stimulus arrangements, agreed with the predictions. No significant difference between the groups on the first pair of test trials was obtained, but the differences between the groups on the last pair of test trials and on the initial segment of the transfer task were in the predicted direction and significant at the 5% level of confidence in each case.

When a separate analysis for each of the four stimulus arrangements was made, the differences between the groups, both for the last pair of test trials and for the initial segment of the transfer task, were in the deduced direction for all four stimulus arrangements, but reached significance only for stimulus arrangement, (S x). This data gave further support to the use of the theory in the present experiment since it was derived from the theory that there would be a sizeable difference between the groups on stimulus arrangement, (S x), but only slight differences between the groups for the other stimulus arrangements, (H x), (x H), and (x S).

Failure to obtain significant differences between the groups at greater than the 5% level was accounted

for partially in terms of the initial preference of the subjects to make a right rather than a left approaching response and partially in terms of the sources of unidentified variance present in the learning and testing situations.

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DEVELOPMENTAL FACTORS AFFECTING SOCIALITY TRAITS AND WORK HABITS AMONG COLLEGE WOMEN

(Publication No. 4121)

David S. Brody, Ph.D.
University of Minnesota, 1952

The Problem and Procedure

The present research was conducted primarily as an exploratory study of the developmental basis of certain phases of social behavior among college women. It was designed:

1. to analyze the interpersonal relationships among a group of women students living together in a college dormitory by means of peer judgments on leadership, social qualities, work habits, degree of acquaintanceship, and acceptability as a roommate, and

2. to test the hypothesis that the social relations which college women establish with each other are a function of (a) the activities in which they have participated in the past, and (b) home background factors such as parental attitudes and behavior, agreement with parents, and rapport with members of the family group.

The subjects of this investigation were 127 Montana State University girls who had lived together for a period of six months in a college dormitory reserved entirely for freshmen women.

Three primary sets of data were obtained:

1. Peer judgments based upon
 - A. Choice behavior as defined in terms of accepting and rejecting others as roommates.
 - B. Formal ratings on leadership, social qualities, degree of acquaintanceship, and work habits.
2. Questionnaires relating to activity participation and home background factors prior to entry in college.
3. Test records pertaining to scholastic aptitude and personality characteristics. The two instruments employed for this purpose were:
 - A. The Minnesota Multiphasic Personality Inventory.
 - B. The American Council on Education Psychological Examination.

Major Findings

It can be concluded that ratings which girls receive from their college peers on sociality traits are at least in part a function of the pattern of activities in which they participated prior to entry in college. Not only are some activities significantly

better than others in differentiating generally between girls rated high and low on sociality traits, but in addition the sociality variables differ markedly among themselves with respect to the number of differentiating items, the direction of the difference, and the kinds of activities represented by the items. The attitudes and behavior of parents and rapport among members of the family group are likewise significantly related to different phases of sociality among college women.

1. The well accepted girls are distinguished by their greater degree of participation in the common household tasks and in those individual and informal group activities in which high school girls as a group most commonly engage. Accepted girls indicate less overprotection by their parents and greater harmony with members of their family group. Lack of conformance with societal standards appears to be an important basis for the rejection of girls by their peers.

2. Girls in the high criterion groups on leadership and social qualities participated more frequently as high school students in individual and informal group activities than those in the low criterion groups except for those activities which were definitely solitary in nature. They also participated more frequently in organized group activities. Girls in the high leadership group are particularly distinguished by a tendency to have engaged in active outdoor sports. Girls high on social qualities were much less likely to be motivated by academic goals than girls rated low.

3. The most distinguishing characteristic of the well known girls is that of hyperactivity. They appear to be best characterized by a history of participation in activities outside the home. The well known girls as a group are highly heterogeneous - some becoming well known by virtue of their desirable traits and others by virtue of their undesirable traits. A tendency toward parental overprotection and control appears to characterize the family background of well acquainted girls.

4. Girls with good work habits are those who are well integrated, capable, highly motivated, and able to assume responsibility. They tend to be self-sufficient and less susceptible to parental and peer group pressures. Although they do not possess the personality attributes valued most highly by their peers, they are, nevertheless, regarded favorably by their contemporaries. The good workers appear to come from homes which provide opportunity for the assumption of individual responsibility.

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RELIABILITY AND VALIDITY OF PSYCHOLOGISTS' EVALUATION OF THERAPY READINESS

(Publication No. 3700)

Catharine A. Burnham, Ph.D.
New York University, 1952

Problem

This investigation studied multi-judge reliability in the psychologist's evaluation of readiness for therapy through the use of diagnostic testing, and attempted validation of these judgments in terms of the treating psychiatrist's rating of performance in therapy.

Populations and Experimental Design

1. The patient population of the study, 28 non-psychotic, white males, was first chosen by 7 members of the psychiatric staff according to a graded scale of the variable, "Therapy Involvement," which may be regarded as the continuing phase of the main variable being considered, "Therapy Readiness."

2. Working with the pre-therapy test protocols of the individuals in the population chosen, the six psychological judges evaluated (by rating in accordance with three criteria checklists and ranking in the supposed order of psychiatrists' choice) each of the cases in terms of "Therapy Readiness."

3. The psychologists' judgments were validated by comparison with the criterion of psychiatric rating, which was inherent (step 1, above) in the choices that originally determined the composition of the patient group.

Test Battery

Each case included in the study had available a test battery including a Rorschach and a Wechsler-Bellevue, and in addition, at least two techniques from the following list:

Thematic Apperception
Projective Sentence Completion
Draw-A-Figure
House-Tree-Person
Bender-Gestalt

Need for the Study

The two-fold problem of the study — therapy readiness prediction and the reliability and validity of psychological evaluations thereof — is of practical as well as theoretical importance in the operation of any agency offering psychiatric treatment.

Summary of the Results

1. Clinical psychologists tend to agree with one another beyond chance expectation in evaluations, based on the protocols of an inadequate clinical test battery, of a patient's readiness to enter a therapy relationship.

2. Evaluations of "Therapy readiness," show an agreement tendency greater than that indicated by the average of the judges' evaluations of the minor

traits (e.g., "Productivity," "Rigidity," "Motivation for change") of which it is postulated by various authorities to be composed. The Gestalt nature of the concept, "Therapy readiness," seems to be pointed up.

3. The tendency of the psychological evaluations of "Therapy readiness" to agree with the psychiatric criteria of performance in the therapy situation, though positive, is not high. (correlation .20, significant to .01 level.)

4. Some individual psychiatrists appear to have selected cases for the study by criteria more closely approaching those used by the psychologists, as two of the seven doctors involved received noticeably greater agreement from the psychological judges.

5. The psychological evaluations of some of the minor traits — "Productivity," "Energy level," and "Emotional depth" — showed a slightly higher validity in terms of the psychiatric criterion than the overall judgments of "Therapy readiness." Although the validity demonstrated even here is of a fairly low order (correlation: .30 significant to .01 level) the predictive efficiency of the psychologist might be increased slightly if he were to judge "Therapy readiness" in terms of evaluations of these three traits."

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AN EXPLORATORY STUDY OF THE EFFECTS OF STIMULATION IN THE DIENCEPHALIC ACTIVATING SYSTEM ON PERFORMANCE

(Publication No. 4055)

W. Dean Chiles, Ph.D.
State University of Iowa, 1952

Drawing from current research in the fields of neurophysiology and electroencephalography, it has been established that the presence of low voltage fast activity in the EEG is an indicator of a high level of alertness in the organism, and the brain stem activating system seems to be a controller of the level of activity of the cortex as measured by the EEG. The evidence behind the above statement is derived from the experimental stimulation of the brain stem activating system, ablation of these areas and the related effects on the EEG of the organism. It has been well established that stimulation of the brain stem activating system leads to the production of a low voltage fast EEG, and the production of lesions in these areas leads to a greater amount of high voltage slow activity. The production of low voltage fast activity in the cortex with stimulation of the brain stem activating system and the correlation of this condition of the cortex with alertness suggests the possibility that the level of responsiveness can be controlled by this stimulation and, by analogy, the drive level of the organism.

The present study was designed as an attempt to

delineate the role of stimulation of the brain stem activating system with respect to performance of a learned act and then, by deduction, the relationship of this stimulation to drive. However, because of the fact that there are known unconditioned responses to relatively high stimulation voltages, the possibility that at lower voltages minimal, unobservable representations of these responses will interfere with the performance must be considered.

The experimental situation involved a modification of the Skinner box making it amenable to use with cats which necessitated the use of horse meat as the best food reward. The criterion measure employed was rate of responding in terms of time elapsed between responses in a free response situation.

The animals were trained to a criterion of no further improvement in performance, at which time electrodes were implanted stereotaxically by the Horsely-Clark method. The animal was then permitted to recover to its pre-operative level of responding before the beginning of the test procedures. The electrodes were placed in the posterior hypothalamus in two animals, in the ventro-medial thalamic nucleus in three animals and in the centrum medianum in one animal.

The animals were run alternately with and without stimulation for as many days as was feasible in the individual case. The voltage of stimulation was set for each animal as that voltage which was just sufficient to produce a minimal pupil dilation or just below that voltage which was sufficient to produce any other overt response. The frequency was kept standard at three-hundred cycles per second.

It was found that for all animals the response rates were significantly slower during stimulation as compared to non-stimulation.

Four possible explanations of this result were discussed. They are as follows: (1) Inappropriate placement of the electrodes; (2) alteration of the "pre-stimulation" stimulus complex; (3) the production of irrelevant responses; (4) interaction of the hunger drive and the "stimulation drive." It was concluded that of these possibilities the most acceptable explanation is the third.

A number of means of further study of the problem are suggested.

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AN EXPERIMENTAL STUDY OF THE EFFECTS OF GUIDANCE IN DISCOVERY ON TRANSFER OF TRAINING

(Publication No. 4171)

Robert Charles Craig, Ph.D.
Columbia University, 1952

The Problem

The present experiment was conducted to get evidence on the transferability of guided learning to tasks of different levels of difficulty and to study

changes in dependence of transfer on initial ability that may be brought about by increasing the amount of guidance in discovery of the bases determining correct responses.

The Experiment

Four groups of fifty young men, all recent college graduates, were equated for initial performance on the learning material. This material consisted of verbal items requiring the learner to select one word of five that did not belong with the others. Each item was meaningful in that there was a relationship among the words that could be discovered and utilized to find the correct answer. The four groups were differentiated during learning by receiving different amounts of guidance in the form of cues, clues, and information about the relationships determining correct responses.

A comparison of the number of errors made by learners receiving clues with the number made by learners not receiving clues showed how the guidance worked operationally. A decrease in errors was noted for each increase in guidance.

A pretest based on the same principles of item organization employed in the learning materials was used for measuring pretraining ability. This test was administered again, immediately after learning, as a post-test to measure transfer. The difficulty of items to which transfer was measured was defined in terms of the percent of subjects answering items correctly on the pretest.

Effect of Guidance on Transfer

After statistical adjustment for initial differences in scores on the pretest items and the American Council on Education Psychological Examination for College Freshmen, comparisons of post-test scores and written statements of reasons for post-test responses suggest the following conclusions:

(1) Irrespective of the difficulty level of the items to which transfer is measured, the amount of transfer of training increases as more and more clues are provided to aid discovery of the bases for correct responses.

(2) The transfer effects from increasing the amount of guidance become greater as the difficulty of the situations to which learning is transferred increases.

(3) In transfer as in learning, the average effectiveness of guidance by grouping situations according to common organizational principles, with or without information concerning the nature of the grouping, is increased several times by supplying learners with short statements of the common principles determining the grouping.

(4) When learners receiving guidance in discovery during the solution of problems organized according to certain principles fail to recognize these principles in problems similarly organized, the amount of guidance received appears to have little effect on tendencies to guess, to incorrectly apply transferred principles, to report reasons insufficient for interpretation, or to invent original bases for solution.

Educational Implications

The results of this experiment affirm the inference from "law of effect" experiments that guidance enabling learners to avoid errors is beneficial. These results with guidance that provides learners with clues to the bases for correct responses are in sharp contrast to results obtained when correct answers are specified for the learner in advance of any attempt on his part to solve the problems.

The present results, if confirmed with children, indicate that, in addition to organizing materials to be learned, the teacher should be liberal in suggestions designed to aid discovery of the organization. Large amounts of guidance, including summary statements of organizing principles, will be beneficial for transfer to items of all difficulty levels; and benefits will increase as difficulty increases. Further, it appears that such guidance does not impair subjects' originality or ingenuity when transfer is inadequate.

The following principles are suggested as a basis for a reconciliation between the advocates of activity and the advocates of guidance:

- (1) Discovery of the bases determining correct responses is essential for efficient learning or transfer.
- (2) Learner activity is necessary but not sufficient.
- (3) For efficient discovery, learner activity should be directed through guidance.
- (4) The more activity is guided, the more efficient discovery; the more efficient discovery, the more learning and transfer.

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INDIVIDUAL DIFFERENCES IN TESTS OF FLEXIBILITY-RIGIDITY

(Publication No. 4173)

Manuel Cynamon, Ph.D.
Columbia University, 1952

It has been hypothesized that rigidity is a general personality characteristic — that a person rigid in one aspect of behavior will tend to be rigid in other aspects of behavior also. Most of the research to-date has been based on the use of Luchins' jar problems to measure mental rigidity. No reliability estimates have been reported for this procedure and it does not lend itself to the use of factor analysis to test the relevant hypotheses.

The present investigation is concerned with the preparation of paper and pencil tests of flexibility-rigidity in intellectual functioning and the use of these tests to test the hypothesis that flexibility-rigidity is a general factor in intellectual behavior.

Rigidity has been defined as the inability to change mental set — as the inability to shift — as the inability to restructure a field in which there are alternative solutions to a problem in order to solve

that problem more efficiently. For this study three tests were prepared in which the subject is required to change mental set, shift, or restructure the field to obtain alternative solutions to the problems. In one test, Figure Similarities, the subject is required to select from five elements three which are alike in some way. The elements are groups of lines in a geometric design. In the second test, Verbal Similarities, the subject is required to select from seven words three that are alike in meaning. Both of these item types permitted the development of multi-answer items so that the same element could be grouped in different ways. The preparation of these test items involved considerable tryout to get an empirical check of the keying of the responses. There was great danger of failure to give credit for a correct response because of the test constructor's own rigidity and limitations. In the third test, Hidden Figures, the subject is required to find a simple figure embedded in a more complex figure. Multi-answers items were developed for this test also.

The line of reasoning taken was, if the several experimental tests do measure flexibility-rigidity in intellectual functioning, a common factor should be generated by their intercorrelations. An experiment was set up to collect such data. In addition to the flexibility tests, single answer versions of Figure Similarities and Hidden Figures, and a conventional type of Vocabulary test were also administered to 174 college students of both sexes. American Council Psychological Examination scores were available for 152 of the subjects.

The corrected reliabilities ranged from .70 to .79 for all the tests except the single answer version of Figure Similarities whose reliability was .52. No flexibility-rigidity factor emerged from the factor analysis that was made. The factors that emerged seemed to be based on the type of test content (verbal, figures, etc.) rather than the process assumed to be involved in the flexibility versions of the tests. Separate doublet factors were generated by Hidden Figures, Figure Similarities and the Verbal tests. The most general factor to emerge had its highest loadings in the American Council examination with sizable loadings in Vocabulary, Verbal Similarities, and the multi-answer version of Figure Similarities.

It was concluded that insofar as the present flexibility tests can be assumed to be valid measures of intellectual flexibility-rigidity that flexibility-rigidity is specific to the ability in which it is demonstrated.

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THE HEART RATES OF STUTTERERS AND NON-STUTTERERS IN RELATION TO FREQUENCY OF STUTTERING DURING A SERIES OF ORAL READINGS

(Publication No. 4063)

Arnold Jason Golub, Ph.D.
State University of Iowa, 1952

The basic assumption behind the present study was that the frequency of stuttering is some direct function of the "fear-of-stuttering" drive. As a working hypothesis it was further assumed that the "fear process" accompanying, or determining, stuttering was intense enough to be expressed by quantifiable change in heart rate.

Three hypotheses were tested: (1) heart rate will increase above basal silence levels when stutterers speak; (2) heart rate will increase during anticipation of speech; and (3) heart rate will decrease as a function of "stuttering adaptation" (the empirical finding that frequency of stuttering decreases with repeated oral readings of the same verbal material).

Heart rate was computed for each subject at selected intervals throughout each of four conditions: half-hour of pre-reading silence, three minutes of warning of oral reading, oral reading of 12 passages, and five minutes of post-reading silence, in the order named. The purpose of the half-hour of silence was to have the subject attain a resting heart rate level before the subsequent conditions were introduced. In the oral reading condition subjects read 12 passages, each 200 words in length. Differing passages were used for readings one to four, and for readings nine to twelve. Readings five through eight consisted of successive readings of the same passage. Both differing and constant passages were used in order to obtain two degrees of stuttering adaptation, and to discover whether heart rate differed with these two degrees.

Subjects were 26 adult male stutterers and 28 adult male non-stutterers. The range of severity of stuttering was very wide, extending from almost no stuttering to fairly severe stuttering. No extremely severe stutterers, however, were available as subjects.

The electrocardiogram was recorded at 15 millimeters per second paper speed. A record was also obtained of frequency and duration of stutterings in order to make possible the computation of heart rate during actual stuttering moments. Analysis of variance techniques were utilized to evaluate differences between the variables under study.

The principal findings may be summarized as follows:

1. There were no differences among stutterers and non-stutterers in average heart rate during any of the four conditions.
2. Neither group significantly increased in heart rate from silence to warning of oral reading.
3. On oral reading the heart rates for both groups increased about ten beats and dropped again after oral reading terminated.

4. During the preliminary half-hour of silence both groups decreased significantly in heart rate, but the stutterers had a smaller absolute drop.

5. There were no significant changes in heart rate during oral reading when all 54 subjects were included in the statistical analysis. When analyses were made separately, both the severe half of the stutterers, 13 subjects, and the 28 non-stutterers showed significant decreases in heart rate as a function of oral reading. The mild half of the stutterers were very variable and the results for them were not significant. The significant changes for the non-stutterers were between the first and second readings and between readings six and seven, while the severe stutterers dropped between the first eight and last four oral readings.

6. During stuttering the heart rate was significantly lower than during fluency, probably a reflection of the sinus arrhythmia concomitant with stuttering moments.

The following conclusions may be made in interpretation of the experimental findings: (1) changes in heart rate during oral reading do not seem to be related to stuttering adaptation; (2) the "fear-of-stuttering" drive may not be reflected by overt physiological changes if the penalty for stuttering is minimal. The conclusions have been offered tentatively and suggestions for further evaluation of them have been made.

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A FORCED CHOICE FORM OF THE TAYLOR ANXIETY SCALE

(Publication No. 4067)

Charles E. Heineman, Ph.D.
State University of Iowa, 1952

The present study was concerned with the development of a forced choice form of the Taylor Anxiety Scale, designed to reduce the effects of possible tendencies by Ss to consider the social desirability of particular responses. Two sets of forced choice items were constructed, one of fifty items utilizing the Taylor A-scale (FC-1), and the other, not used by Taylor, of fifty items which exhibited a high correlation with the A-scale (FC-2). The forced choice form investigated consisted of three statements, an anxiety statement and a non-anxiety statement of comparable social favorability, and a second non-anxiety statement differing in social favorability from the two matched statements.

Ss were instructed to respond by selecting one of the statements as "most descriptive" and one as "least descriptive" of themselves. These responses were scored by two methods, one using the ranking of all three statements (Key 1) and the other using the ranking of the two statements of equal favorability (Key 2). This forced choice scale of anxiety was administered

to 209 students who had taken the A-scale about ten weeks previously.

The following results were obtained:

1. The Key 2 scores of FC-1 showed a significantly lower correlation with the A-scale than did the Key 1 scores of FC-1.

2. The correlation between FC-1 and FC-2 of .79 for Key 1 and of .74 for Key 2 were so high that they were combined into a total score, FC-T, which was used to investigate the influence of social favorability on test scores.

3. The A-scale and the Key 1 score of the forced choice scale were more reliable, in terms of internal consistency, than the Key 2 score of the forced choice scale.

4. The distribution of scores in the A-scale was positively skewed. The correction of this positive skewness by use of the forced choice technique was taken as an indication of decreased effectiveness of the social favorability factor in the forced choice scale.

5. The magnitude of the correlation with the MMPI K-scale was greatest for the A-scale and smallest for the Key 2 scores of the forced choice scale. This suggested that the A-scale was most and the Key 2 score was least subject to the influence of social acceptability.

6. It was shown that the A-scale scores were most affected by instructions to Ss to place themselves into the most favorable light possible. The Key 2 scores of the forced choice scale were relatively insensitive to such instructions. The Key 1 scores were affected to a smaller degree than the A-scale scores. These results again indicated that the A-scale was most susceptible and that the Key 2 scores of the forced choice scale were least susceptible to the influence of the social favorability variable.

7. Anxious Ss, defined by their scores on the A-scale, differed from nonanxious Ss in their estimate of the social desirability of anxiety statements. This was taken as evidence to suggest that the influence of social favorability may not have been entirely eliminated by the use of the forced choice technique. However, the results of this investigation clearly indicated that the influence of social desirability on test scores could at least be drastically reduced.

Microfilm copy of complete manuscript of 97 pages, \$1.21. Enlargements 6" x 8", 10¢ per page.

PERCEPTUAL JUDGMENT AS A FUNCTION OF MENTAL SET, ANCHORING POINT, AND METHOD OF JUDGMENT

(Publication No. 3972)

Charles W. Hill, Ph.D.
Vanderbilt University, 1952

The purpose of this study was to integrate and extend recent explorations into the dimensions of perceptual judgment by investigating the interactions

of three critical variables under controlled laboratory conditions. The variables selected were (1) mental set, (2) anchoring point, and (3) method of judgment.

Ninety-six senior college and graduate students were presented with a series of 46 visual stimuli in the form of unique geometric figures which varied in symmetry. Seven categories were established by a priori design and verified through subjective scaling. Each figure was exposed for 5 seconds in several random orders. The Ss made and recorded a judgment as to the relative degree of symmetry of each figure upon a seven-point graphic rating scale.

The mental set was produced by the instructions of the E in the form of a suggestion that most of the figures were above average in symmetry. The anchoring point was a figure of average symmetry that was exposed and identified as such. Each of these two variables was either present or absent for each subject. For the method of judgment, the Ss were either encouraged to analyze the figures or told to base their judgments upon their first over-all impression.

Eight sets of experimental conditions were formed from all the possible combinations of the three independent variables, and the Ss were assigned randomly to groups corresponding to these eight conditions. The experimental situation was standardized within each group, and only those deviations required for the introduction of the experimental variables were permitted between groups.

The mean of each of the ninety-six individual distributions of judgments was computed. These means were then combined into group means, and the differences among these group means were compared and tested for statistical significance. The strong and consistent influence of the Set toward high symmetry, with or without the presence of the anchoring point and regardless of the method of judgment, was significant beyond the .1% level of confidence.

The individual distributions were then divided into two halves of 23 judgments each. Individual and group means were computed for both half-distributions. An analysis of the inter-half differences among these means revealed that the increasing influence of the anchoring point from the first to the second half could be accepted at the .05 level of confidence. An analysis of the intra-half differences among the means produced results as follows: (1) the influence of the mental set was highly significant in both halves, and (2) the influence of the anchoring point could be accepted as significant at the .05 level of confidence in the second half only.

These results were discussed in detail in an effort to rationalize the failure of the anchoring point and analytic method to counteract the influence of the "suggestion." Some methodological weaknesses were pointed out, and it was concluded that further study should be conducted with more than one anchoring point.

The disturbing implications of the experimental results for social situations were then touched upon, although the limitations to such generalizations were

also realized. It appeared that the average individual must be quite helpless when exposed to propaganda and salesmanship, and the innumerable complexities attendant upon furnishing him with the necessary anchoring points were discussed.

The following conclusions may be drawn from this study:

1. The influence of a mental set, especially in the form of a suggestion, may be a strong, determining factor in the perception and subsequent judgment of an unstructured situation.
2. The presence of an anchoring point, in the form of an object or event known to be located at the mid-point of the scale in question, may be of help in stabilizing the perceptions and judgments, but its influence should not be taken for granted.

Microfilm copy of complete manuscript of 123 pages, \$1.54. Enlargements 6" x 8", 10¢ per page.

THE DISPARITY BETWEEN PHENOMENA REPORTEDLY RELATED TO RIGIDITY

(Publication No. 4198)

Jack Travis Huber, Ph.D.
Columbia University, 1952

Purpose of the Investigation

Rigidity, in the sense of incapacity to change, has long been recognized as an important concept in psychology. Other psychological phenomena, such as perseveration, concrete thinking, and others have been noted in groups exhibiting "rigidity," and these phenomena have been reportedly related to rigidity. Attempts have been made to demonstrate that rigidity is a general factor in personality, and definitions have become so generalized as to be relatively meaningless. The general purpose of this research was to demonstrate that the phenomena perseveration, concrete thinking (with verbal and non-verbal material), and attitude crystallization are not significantly related, and for this reason a generalized factor such as rigidity including these phenomena cannot be postulated. The specific questions to be answered by the research were:

1. Which of the measures of these three aspects of personality are related significantly?
2. If any are related significantly, what accounts for the relationship?
3. What may be concluded about the concept of rigidity from this study?
4. What may be concluded about the other concepts — perseveration, concrete thinking, and attitude crystallization?

Procedure

The subjects were sixty white male mental patients, ranging in age from 20 to 35 years, and obtaining 87 to 131 full scale IQ's on the Wechsler-Bellevue Intelligence Scales. Each subject was given the following series of tests: (1) A vocabulary test of 40 nouns, designed for this research to give

a measure of verbal abstract-concrete thinking; (2) The Beier revision of the Holsopple Test, designed to give a measure of abstract-concrete thinking with non-verbal material; (3) A battery of four perseveration tests devised by Cattell to give a single perseveration score; (4) Two Thurstone Attitude Scales — The Constitution of the United States and Birth Control (Forms A). Two weeks after the first testing session all subjects were given Forms B of the same scales. From these two administrations two crystallization scores were derived, one for the Constitution and one for Birth Control. High estimates of reliability were demonstrated for all measures used.

Conclusions

In answer to the questions asked by the research:

1. Significant correlations were found between perseveration and verbal concrete thinking and between the two measures of concrete thinking (verbal and non-verbal).
2. Correlations between IQ and perseveration, verbal concrete thinking, and non-verbal concrete thinking were appreciable. When IQ was partialled out from the intercorrelations of all variables, none of the correlations was significantly different from zero. Reduction of the two significant correlations to correlations not significantly different from zero by partialling out IQ leads to two conclusions: (1) part of what is called "rigidity" or concrete thinking may be associated with lower intellectual functioning, and (2) part of perseveration may also be associated with lower intellectual functioning.
3. A general concept of rigidity cannot be postulated on the basis of the relationship found to exist between measures of perseveration, concrete thinking, and attitude crystallization. Thus, the term rigidity requires delimitation and clarification.
4. For the abnormal population studied, perseveration, concrete thinking, and attitude crystallization as measured here are discrete concepts. Perseveration and concrete thinking have long been useful terms in psychology and should not be confused with rigidity. Since the measures of verbal and non-verbal concrete thinking were not found to be significantly associated when IQ was partialled out, a need appears to exist to clarify the concept of concrete thinking. Attitude crystallization may require further clarification if the term rigidity centers in the area of attitudes, as was suggested by this research.

Microfilm copy of complete manuscript of 72 pages, \$1.00. Enlargements 6" x 8", 10¢ per page.

THE APPLICATION OF THE PRIMARY MENTAL ABILITIES TEST TO MENTAL DEFECTIVES

(Publication No. 4071)

James Francis Hutcheon, Ph.D.
State University of Iowa, 1952

I. The principle purpose of this comparative study of the performances of mentally defective and normal subjects on the Primary Mental Abilities (PMA) tests was to determine if there were significant differences in the subtest profiles of the two groups. The study also dealt with the differences in intra-individual variability in normal and mentally defective subjects, with the differences in the subtest profiles of mental defectives in different clinical classifications, and with the differences in intra-individual variability in these classifications of mental deficiency.

II. The mentally defective subjects consisted of 224 male and female patients of the Woodward State Hospital and School. All were 25 years or younger in age, and had IQ's of 75 or below. The normal subjects consisted of 202 children who obtained IQ's between 75 and 125 when the PMA tests were administered to groups of kindergarten, second, and third grade pupils in the grade schools of two Iowa towns. Each subject was given either the PMA for Ages 5-7 or the PMA for Ages 7-11, whichever was the more appropriate in view of his expected mental age.

III. Results

A. Characteristics of the PMA tests

1. The subtest profiles of the normal subjects were found to be significantly uneven for both the 5-7 and 7-11 batteries.
2. With the exception of the finding of significant superiority of the girls on the Motor subtest (which does not enter into the Total mental age score), there were no significant differences between normal males and females on the 5-7 battery.
3. Significant differences in the performances of normal males and females on the 7-11 battery were found.
4. There were no significant differences between defective males and females on the 5-7 battery.
5. Significant differences in the performances of defective males and females on the 7-11 battery were found.

B. Comparison of the Performances of Normals and Mental Defectives

1. On the 5-7 test battery, the profiles of the normal and defective subjects were significantly different, the mental defectives showing superiority on the Perceptual-Speed subtest.
2. On the 7-11 battery, the profiles of the normal and mentally defective males were significantly different, the normals showing superiority on the Reasoning subtest and the mental defectives

showing superiority on the Number subtest.

3. On the 7-11 battery, the profiles of the normal and mentally defective females were significantly different, the mental defectives showing superiority on the Verbal subtest and the normals showing superiority on the Perceptual-Speed subtest and questionable superiority on the Reasoning subtest.
4. On the 5-7 battery, the mental defectives showed significantly greater intra-individual variability than did the normal subjects.
5. On the 7-11 battery, no significant differences between normal and mentally defective subjects with respect to intra-individual variability were found.

C. Comparison of Subgroups of Mental Defectives

1. No significant differences in the profiles of the different classifications of mental defectives for either the 5-7 or 7-11 battery were found.
2. No significant differences with respect to intra-individual variability were found, although a somewhat greater variability for "brain-injured" defectives, as compared with the other classifications, was suggested.

D. Factor of Institutionalization

1. In a comparison of two groups of defectives, characterized by marked differences in length of institutionalization, no significant differences in 5-7 PMA profiles were found. There were, however, suggestions that prolonged institutionalization might result in an undue retardation in the development of verbal abilities.

IV. Conclusions

- A. The finding of significant unevenness in the profiles of the normal subjects requires confirmation. If verified, it indicates that the PMA tests, in their present state of development, should not be used for individual evaluation in geographically heterogeneous groups of children until either local norms or more comprehensive national norms have been established.
- B. The unexpected finding of significant sex differences in the performances of normal subjects on the 7-11 battery calls for re-investigation. If the finding is verified a separate norms for boys and girls on this test are indicated.
- C. The comparative investigation of the profiles of normal and mentally defective subjects yielded inconsistent results. Some of the specific findings appeared to support the suggestive evidence in the literature, others did not. The fact that many of these findings were derived from single-sex comparisons and were not evident in the comparison of the other sex seriously vitiates their

possible significance. However, two results occurred with sufficient consistency to warrant mention. There was a fairly consistent superiority of the normal subjects in respect to performance on the Reasoning subtest. This finding is in accord with the trend of previous investigations. On the other hand, there was a consistent lack of evidence that any difference in level of performance on the Space subtest exists. This finding is in contradiction to the indications of previous investigations.

- D. The failure to find differences with respect to subtest profiles or intra-individual variability when the various classifications of mental deficiency were compared suggests that many of the statements in the clinical literature concerning such alleged differences may be premature.
- E. The indication that length of institutionalization may be correlated with an undue retardation in the development of verbal abilities suggests that the factor of institutionalization requires more careful control in comparative studies than it has heretofore received.

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AN INVESTIGATION OF A PROJECTIVE TEST IN DETERMINING ATTITUDES OF PROSPECTIVE TEACHERS OF PHYSICAL EDUCATION

(Publication No. 4074)

Eloise Magdalene Jaeger, Ph.D.
State University of Iowa, 1952

The purpose of this study was to construct a projective test similar to the TAT that would measure the attitudes of prospective teachers of physical education toward the teaching of physical education. It was thought that if such a technique could be developed, it would prove to be an invaluable tool in the selection and guidance of students majoring in the field of physical education.

The procedure consisted of developing a test called the Physical Education Picture Story Test, and administering it to freshmen and senior students majoring in physical education at each of the following institutions: Iowa State Teachers College, Illinois State Normal University, University of Minnesota and the State University of Iowa. The number of subjects tested was 149.

The test consisted of a series of 16 pictures depicting various activities of a teacher of physical education. The subject was asked to develop a story centering around the central figure of the teacher.

The stories were evaluated by three competent judges from the field of physical education. In addition, two psychologists participated as judges in a small group study. The evaluation procedure

consisted of rating each story on a basis of positive (+), neutral (N), negative (-) and zero (0) values.

The criterion measure used in this study consisted of behavioral ratings made by staff members from the respective departments of physical education.

A secondary part of the study consisted of an attempt to determine the relationship between the Physical Education Picture Story Test and scholastic aptitude and vocational interest tests.

Due to the fact that the behavioral ratings were made by different individuals, and scores obtained on scholastic aptitude and vocational interest tests were from different test forms, each group included in the study was treated independently. Correlations were computed by the Rank Order method, and reliability of the judges' ratings was determined through the application of Snedecor's Formula (based on the analysis of variance).

The results, as based on the criterion measure and limited sample used in this study, found the test invalid as a measure of attitude toward the teaching of physical education. However, it is believed that the technique has definite possibilities provided certain shortcomings can be met.

Microfilm copy of complete manuscript of 133 pages, \$1.66. Enlargements 6" x 8", 10¢ per page.

STRENGTH OF FEAR AS A FUNCTION OF THE NUMBER OF ACQUISITION AND EXTINCTION TRIALS

(Publication No. 4076)

Harry Isidore Kalish, Ph.D.
State University of Iowa, 1952

Previous experiments have suggested that the number of fear-acquisition and extinction trials should be significant variables in fear-conditioning. But no systematically determined functional relations exist. The present experiment was designed (1) to determine the relation between strength of fear and varying numbers of acquisition trials, and (2) to investigate the extinction of fear under conditions in which no new response is learned during extinction.

A total of 138 hooded, female rats, including a control group of 10 Ss were run in a factorial design in which the experimental variables were (1) number of fear-acquisition trials (1, 3, 9, and 27), and (2) number of fear-extinction trials (0, 3, 9, and 27).

The experimental procedure was divided into three phases: (1) acquisition of fear, in which the various groups of Ss received differing numbers of paired presentations of CS and shock, (2) extinction of fear, which consisted of the presentation of the CS without shock, and (3) acquisition of hurdle jumping. During the hurdle-jumping trials the CS was presented without shock and the Ss permitted to jump a hurdle and enter a second compartment. After this response was completed the CS was terminated by E. The cessation of fear, following the hurdle-jumping response and the termination of the CS,

operated to reinforce hurdle-jumping behavior. Therefore, inferences concerning the various levels of fear were made from the latencies obtained during hurdle-jumping. These latencies were grouped in blocks of three trials and transformed to logarithms. A backward conditioning procedure was employed for the control group.

The results obtained from the hurdle-jumping series indicated that the experimental variables had a significant effect upon the acquisition of hurdle jumping. Data obtained from the control group suggested that the CS was neither inherently noxious nor had acquired fear-arousing properties for this group. It was also shown that the cues from the box and grid, as potential fear-arousers, were negligible.

It was concluded that fear increases as a monotonic function of the number of fear-conditioning trials and weakens progressively with successive extinction trials.

Two alternative interpretations within Hull's learning theory were proposed to explain the results.

Microfilm copy of complete manuscript of 83 pages, \$1.04. Enlargements 6" x 8", 10¢ per page.

AN ANALYSIS OF THE PHYSICAL AND
PHYSIOLOGICAL CHARACTERISTICS AND
ENDURANCE PERFORMANCE OF YOUNG
MEN: A COMPARATIVE ANALYSIS WITH
PARTICULAR REFERENCE TO THE
SUBJECTS WHO EXHIBIT A LOW AND
MODERATE DEGREE OF ENDURANCE

(Publication No. 3701)

Henry Christopher Kamienski, Ed.D.
New York University, 1951

This investigation was conducted for the purpose of analyzing two groups of young male college students with respect to the relationships that exist between physiological and physical characteristics and endurance performance. This study has significance because it seeks to contribute toward the clarification of knowledge about the relationship that exists between physiological changes and endurance and physical characteristics and endurance. The many variables (physiological and physical) were applied to each subject and the experimental procedures were standardized to get the most accurate and reliable data.

The subjects were 16 normal male college students ranging from 20 to 25 years of age. These males represent the middle and lower third groups of the original 24 males tested. Each subject was ranked according to the calories per square meter of body surface he utilized in his performance on the treadmill which was set at an 8.6% incline and for speeds of 2.3, 3.5, 4.6, and 6.9 miles per hour. The subject kept pace for six minutes in each successive speed until he was completely exhausted.

The physiological variables were measured before, during, and after stress at the various times which would be most indicative of the information sought. These variables were: hematocrit, blood oxygen, blood pH, blood plasma volume, blood lactic acid, pulse rate, body temperature, respiratory rate, oxygen consumption, oxygen debt, carbon dioxide output, vital capacity and ventilation volume. The 21 physical measurements considered were: ankle girth, chest girth (inflated), chest girth (deflated), knee width, hip width, shoulder width, chest depth, chest breadth, abdomen girth, calf girth, gluteal girth, biceps girth, thigh girth, adipose tissue on cheeks, abdomen, waist, front thigh, rear thigh, and glutei, and height and weight. A graphic representation of the data was made by plotting the physiologically related variables on diagrams. All physical measurements were plotted against total work done. The Fischer Small sample "t" test was used to determine the significance of the difference between the means of group II and group III.

Analyses of the diagrams and tables resulted in the following observations:

1. The highest lactic acid concentration attained is not correlated with the total work done.

2. Oxygen debt is not correlated with either the lactic acid concentration in the blood or to the total work done during exercise.

3. A high correlation exists between respiratory quotient and the volume of air inspired, volume of oxygen consumed, and the volume of carbon dioxide exhaled.

4. There is a good relationship between ventilation volume and total work done.

5. Exercise to exhaustion brings about these conditions:

- a. Plasma volume decreases
- b. Hematocrit increases
- c. Lactic acid concentration in the blood increases
- d. Oxygen consumption increases
- e. Carbon dioxide exhaled increases
- f. Ventilation volume increases due to an increase in the rate and greater depth of respiration
- g. Oxygen consumption and carbon dioxide output are highly correlated to each other and to ventilation volume
- h. pH drops
- i. The ventilatory efficiency decreases.
- j. Respiratory quotient increases
- k. Arterial blood oxygen content increases

6. During the recovery period after exercise the above changes reverse themselves and continue till the pre-exercise level is reached. The lactic acid concentration did not reach that level even after 120 minutes of recovery. The mean pulse rate needs the entire 120 minute recovery period to return to the basal rate. The respiratory quotient continues to rise during the first 15 minutes of recovery and then returns to the pre-exercise level.

The following conclusions were drawn:

1. There is no relationship between each of the physical measurements taken and the total work done.

2. No significant difference is noted between the two groups for each of the physical measurement variables.

3. Group II (the middle group) does not differ significantly from group III (the lower group) during the exercise and the recovery periods.

4. No variable (physiological function or physical measurement) used in this investigation, could differentiate between the group that is capable of doing a great deal of work from the group that is not.

Microfilm copy of complete manuscript of 223 pages, \$2.79. Enlargements 6" x 8", 10¢ per page.

THE EFFECTS OF NOXIOUS STIMULUS INTENSITY AND DURATION DURING INTERMITTENT REINFORCEMENT OF ESCAPE BEHAVIOR

(Publication No. 4202)

Michael Kaplan, Ph.D.
Columbia University, 1952

Occasional termination of a noxious stimulus by an operant occurring in its presence has been regarded as the condition defining the general case of intermittent reinforcement of escape behavior. Two experiments which deal with this phenomenon have been reported.

The first study sought to determine the white rat's rate of escape responding under aversive light of 183 millilamberts as a function of the noxious stimulus interval between intermittent reinforcements. Durations of the intervals were 0.2, 0.5, 1.0, 2.0, 3.0, 4.0, 5.0 minutes.

The purpose of the second experiment was to determine rate of escape responding as a function of noxious stimulus intensity during intermittent reinforcement at a 0.5 minute interval. Light intensities used were 27, 111, 183, 530, 960, and 2312 millilamberts.

Eleven male Wistar albino rats, trained to stand on a perch in an enclosed chamber, received 42 sessions of regular reinforcement, during which each bar-press in light (183 mL) terminated it for 1.1 minutes. During intermittent reinforcement, each of them received an average of 15 consecutive training sessions, five rats under each of the seven durations, and six rats under each of the six intensities. The order in which these conditions were presented generally differed for each animal, and during these sessions, each terminating response produced 1.1 minutes of darkness.

The principal findings of the studies are:

1. As the noxious stimulus interval between intermittent reinforcements is increased, (a) the rate of escape responding declines sharply and approaches an asymptote, and (b) there is an increase in the average number of escape responses emitted per interval.

2. The curve relating rate of escape responding

to noxious stimulus intensity under intermittent reinforcement at a 0.5 minute interval (a) changes significantly over a range of only 3.3 responses per minute and (b) appears to pass through a maximum between 111 and 530 millilamberts.

Microfilm copy of complete manuscript of 38 pages, \$1.00. Enlargements 6" x 8", 10¢ per page.

A STUDY OF THE RELATIONSHIPS AMONG SEVERAL MEASURES OF RIGIDITY

(Publication No. 4077)

Arnold Katz, Ph.D.
State University of Iowa, 1952

1. The purpose of the present investigation was to study the relationships between responses to five independent situations, all of which have been employed in the literature as definitions of the personality trait of rigidity. The situations consisted of the Iowa Manifest Rigidity Scale, the California Ethnocentrism Scale, the Wesley modification of the Wisconsin Card Sorting Test, the Rokeach adaptation of the water jar problem series, and the Rorschach Test. Rorschach rigidity was defined in terms of global ratings by several clinicians, and also by various simple indices and composite scores chosen from the literature on the basis of claims made for them as discriminatory measures.

2. Seventy-two subjects were selected, by means of a stratified sampling technique from the 1951-52 introductory psychology class at the State University of Iowa. All the tests were administered to all the subjects on an individual basis, and an intercorrelational analysis of the relevant response measures was made.

3. It was found that, in general, clinicians showed striking consistency in their ratings of rigid behavior on the basis of Rorschach performance. These ratings and the several Rorschach indices were, for the most part, significantly interrelated.

4. The results failed to offer evidence to support the concept of rigidity as a general personality characteristic. However, despite the failure to find over-all consistency among the measures employed, there were instances in which two variables were significantly related. Specifically, the Iowa Manifest Rigidity Scale and the California Ethnocentrism Scale were significantly related to each other, but neither of these measures was consistent with behavior in the other three situations. Although behaviors in the water jar and card sorting tests were not related to each other, several Rorschach measures reliably differentiated the performances of subjects in both situations.

5. The findings indicate the necessity for a re-evaluation of the use of the rigidity concept in clinical psychology and psychiatry. Frequently, clinicians indicate the degree of rigidity exhibited by an individual in one situation, and then infer that rigidity will be manifested to a similar extent in widely differing

situations. It is suggested that this practice is questionable. The results obtained with respect to the significant relationships between behaviors in certain pairs of tests raise the possibility that rigid modes of response may be of sufficient generality to show consistency over limited ranges of situations. However, since the observed relationships were of such magnitude as to account only for a minor portion of the variance for the behaviors under consideration, it is probable that other relevant variables will have to be taken into account in order to achieve efficient prediction.

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THE PSYCHOLOGICAL EFFECTS OF REGRESSIVE ELECTROSHOCK THERAPY

(Publication No. 4143)

Jack Daniel Krasner, Ph.D.
New York University, 1952

This investigation was directed toward determining and evaluating by means of a psychological test battery the effects of Regressive Electroshock Therapy (REST) on chronic schizophrenic patients. The patient population of this study were twenty schizophrenic patients between the ages of 16 and 43, seven males and thirteen females. The diagnostic sub-classification of the group included thirteen paranoid, five mixed, one catatonic and one hebephrenic schizophrenia. All of the subjects completed at least one year of high school and seventeen had received some college education. The subjects' occupation fields included gambler, housewife, student, clerk, actress and physician. The average estimated duration of illness prior to REST was over six years, ranging from seven months to over twenty years; twelve of the subjects had previous hospitalization and all had received organic convulsive treatment prior to REST.

The psychological test battery administered to each subject before and eight to ten weeks after REST included the Bender Visual Motor Gestalt Test, C.A.S. Test, Rorschach Test, Figure Drawing Test, and the Controlled Word-Association Test. The test battery was analyzed with specific reference to the determination and evaluation of the changes in personality functioning of the subjects, both individually and as a group, effected by REST. The interpretation, evaluation and integration of each subject's pre- and post-REST test battery in relation to global proficiency were independently done by the investigator. Data relating to the changes in personality functioning characteristics, i.e., intellectual functioning, emotional reactivity, sexual and interpersonal adaptation were obtained with the aid of three qualified psychologists who used twenty personality scales and one cerebral damage scale which were devised by the investigator, and qualified by two independent psychotherapists.

The agreement among the judges, both psychologists (diagnostic) and therapists, was also determined.

The data obtained with the aid of the psychologists showed that the number of psychological functioning categories in which the subjects manifested improvement ranged from four to nineteen, the majority showing improvement in ten or more categories. With the exception of only one, no subject showed a decrement in more than three of the psychological functioning categories. An analysis of the total investigated REST population in relation to the individual psychological functioning categories revealed that change, direction of change or lack of change in one category was not exclusively dependent upon or determined by a similar change in another specific category. All categories were found to be interrelated. There were sixteen categories in which the frequency of patients showing improvement was ten (50%) or more. The categories in which the greatest number of patients showed improvement, sixteen (80%) each, were Contact with Reality and Mode of Adaptation to Interpersonal Relationships. The number of patients who showed improvement in the other categories ranged from thirteen (65%) in Emotional Developmental Stage and Concept of Self-Image to five (27%) in Attitude Toward the Father Figure. The number of patients showing decrement never exceeded two (10%) except in Attitude Toward the Father Figure which had a frequency of six (30%). A complete lack of cerebral damage, as evinced in the test battery was found for both the pre- and post-REST results.

The data based on the case presentations of the subjects' pre- and post-REST global proficiency showed that the respective patient's diagnosis was not changed by REST. However, seventeen (85%) of the patients manifested improvement in their post-REST psychological functioning pattern, being more amenable to psychotherapy and only one patient's condition was worsened. Comparisons of changes in the subjects' amenability to psychotherapy in respect to certain factors, suggested that age, sex, and/or diagnostic classification had little effect on the changes effected by REST.

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A COMPARISON OF TWO TECHNIQUES OF INTERPRETING TEST RESULTS TO CLIENTS IN VOCATIONAL COUNSELING

(Publication No. 4207)

David Lane, Ph.D.
Columbia University, 1952

One of the crucial steps in the vocational counseling process is the interpretation of test results to clients. The present study has attempted to compare the effects of self-knowledge of two methods of test interpretation. Method A is a "traditional," authoritative technique, in which the counselor

controls the interview, synthesizes the data, and presents his own opinions. Method B is a permissive technique, based on nondirective counseling, in which the counselor remains neutral, and encourages the client to synthesize the data and to express his reactions to them.

A battery of standard educational and vocational tests was administered to a group of 111 high school juniors and seniors. The investigator then conducted a test-interpretation interview with each subject, alternating the two methods with successive subjects. One week after the interview each subject filled out a multiple-choice check-list and answered an essay question. These instruments were designed to measure memory of the test scores which had been interpreted in the interviews. This procedure was repeated three weeks later. The reliability of this check-list was estimated by computation of the coefficient of correlation between scores on the first and second administrations. The coefficient of correlation was .764. Twenty of the interviews were recorded, and the transcriptions were submitted to five judges. The judges were asked to identify the method used in each interview and to rate the counseling as to its effectiveness. In 99 out of the 100 judgements the interviews were labelled correctly as to method. Both methods received ratings approximating "good" on a scale which called for ratings of "excellent," "good," "fair," "poor," and "very poor."

The principal finding of the experiment was that the two groups of subjects were almost identical in mean score on the criterion measure. The differences in test-interpretation technique had no discernible effect on the subjects' ability to remember their test scores. Score on the check-list criterion measure showed a low, positive relationship to scholastic aptitude.

The implications of the study are limited by the conditions under which the testing and counseling were conducted and by the nature of the criteria of self-knowledge used. All subjects received the same tests. Each interview lasted approximately one class period. Each subject expected a detailed presentation of his test scores. The criteria of self-knowledge restricted themselves to measuring the subjects' memory of their test scores. They did not measure degree of emotional acceptance of the data, nor ability to integrate the data in planning.

One implication of the study is that factors other than counselor technique play a major role in determining the degree to which clients learn and retain the information presented to them in test-interpretation interviews, and therefore that the choice between the techniques of test interpretation investigated in this study is, by itself, a matter of indifference in determining the degree of client self-knowledge attained. Much high school and college counseling is conducted in a manner similar to that of the program carried on in this study, with all students receiving a standard battery of tests and with counseling confined to one test-interpretation interview for each student during that school

year. The results of the present investigation suggest that, in a program of this kind, the choice between these two techniques is not important. It is suggested that any differences in effect which may exist between the two methods would be likely to reveal themselves only in a situation in which test interpretation was made a part of a larger pattern of counseling differences.

Microfilm copy of complete manuscript of 147 pages, \$1.84. Enlargements 6" x 8", 10¢ per page.

AN EXPLORATORY STUDY OF PERSONALITY AND ITS RELATIONSHIP TO SUCCESS IN PROFESSIONAL BASEBALL

(Publication No. 4208)

John Peter LaPlace, Ph.D.
Columbia University, 1952

The purpose of this research was to determine whether or not specific personality traits are associated with success in professional baseball. Personality traits believed to be of importance in professional baseball were:

1. Attitudes towards health;
2. Drive — composed of ambitiousness, aggressiveness, and vigorousness;
3. Optimism and self-confidence;
4. Self-discipline;
5. Ability to get along well with other people.

These personality traits were measured by the Minnesota Multiphasic Personality Inventory, and supplementary information was obtained through the use of a Biographical Data Sheet. Success was employed in the study as meaning that a player had reached the major leagues.

The problems were to discover how the personality pattern of major league players differs from the personality pattern of members of the general population, and most of all, how the personality pattern of major league players differs from the personality pattern of minor league players.

Major league representation was obtained from players in the National and American Leagues. Minor league representation came from players in the Class D Coastal Plains League in North Carolina. The norms of the MMPI were employed to represent the general population. It was safe to assume that the minor league players would never become major league players, because only one out of every 383 players entering professional baseball reaches the major leagues.

The players were interviewed during the summer of 1951. Forty-nine major league players and 64 minor league players responded to the MMPI. Sixty-nine major league and 70 minor league responses were obtained to the Biographical Data Sheet.

Major league players were compared to minor league players and to the general population on the basis of mean scores on the MMPI scales. The results of this analysis reveal that major league players

exercise greater self-discipline and get along better with other people than minor league players. As compared to the general population, major league players appear to be worrisome, rather than optimistic and self-confident, and also sensitive; but they are more ambitious, aggressive, and vigorous, and they are better able to get along well with other people.

The three groups are not significantly different in their attitudes towards health.

MMPI profiles were prepared for the major league and minor league players to study the pattern of their scores. The major league profile indicates a personality pattern dominated by strong drive which manifests itself in traits such as ambitiousness, vigorousness, and aggressiveness. The profile of minor league players reveals a personality pattern similar to that of behavior problem individuals.

A group of experts on professional baseball selected items from the MMPI which they thought would distinguish successful players from those not potentially successful, and these items were arranged into a scale. Major and minor league players were scored on the basis of this scale, but no significant differences appear.

From the Biographical Data Sheet it is learned that:

1. Baseball players tend to come from larger than average families.
2. Baseball players tend to come from urban rather than rural areas.
3. Minor league players are brought up in the "broken home" situation more often than members of the general population.
4. Major league players tend to start playing baseball at an earlier age than minor league players.
5. A representative group of major league players did not enjoy success in the minor leagues and have apparently reached the major leagues on the strength of their determination.

Conclusion

The results of the study indicate the existence of personality traits that are related to success in professional baseball. These traits appear to be:

1. Strong drive; characterized by ambitiousness, aggressiveness, and vigorousness;
2. Self-discipline;
3. Ability to get along well with other people.

Microfilm copy of complete manuscript of 120 pages, \$1.50. Enlargements 6" x 8", 10¢ per page.

THE EFFECT OF VARIATION OF MOTIVATIONAL LEVEL AND CHANGES IN MOTIVATIONAL LEVEL ON PERFORMANCE IN LEARNING

(Publication No. 4083)

Henry Bernard Loess, Ph.D.
State University of Iowa, 1952

The experiment was designed with three primary objectives: 1) to permit comparison of performance during learning under two levels of motivation in two types of situations, a) an instrumental conditioning situation and b) a selective, competing response type of learning situation; 2) to study the effects of changing the drive level upon performance measures in those situations; and 3) to obtain evidence of whether differences in motivation level lead to differences in amount of habit strength developed during learning.

The apparatus consisted of two manipulanda, projecting bars, which could be presented singly or together. The response measures obtained were choice of one bar over the other in the competing response situation (both bars presented) and speed of response in the instrumental conditioning (single bar) situation. Seventy-six animals were used in the experiment. During the first part of training half were run under three and half under twenty-two hours food deprivation. At the end of this period half the animals in each group were switched to the opposite drive state while the remaining animals were kept at the original deprivation level. All animals were then given additional training.

Results for the first training period showed that in the instrumental situation the animals in both groups came to respond significantly faster to the short delay bar than to the long delay bar and the animals in the 22 hour group responded significantly faster to each of the bars than did the 3 hour group. In the choice situation it was found that the animals in both groups developed a significant preference for the short delay bar, but the degree of preference was not different for the two motivational levels.

Data for the second part of training showed that on the first few instrumental conditioning trials the animals in the experimental groups (those who had their deprivation time switched) tended to perform poorer than the corresponding control groups, but eventually each experimental group reached the same level of performance as the control group with the comparable deprivation time. Data for the choice trials, however, showed no significant effect introduced by a shift in motivation level.

The results were discussed in terms of Hull's 1943 theory and in terms of recent modifications of that theory made by both Hull (4) and Spence (20, 21, 22). The conclusion was reached that a comprehensive behavior theory must take into account the different results obtained in selective, or competitive response situations as compared to simple instrumental response situations.

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THE EFFECT OF LIGHT-DARK RATIO IN CRITICAL FLICKER FUSION THRESHOLD DETERMINATIONS

(Publication No. 4212)

Nicholas Byron Louis, Ph.D.
Columbia University, 1952

The existing literature on flicker fusion indicated that that interesting apparent paradoxes exist in which may or may not constitute exceptions to the time-space-energy relationships of the physical universe. A review of the literature dealing with the light-dark ratio problem indicated that many inconsistencies exist, some of which are in diametric opposition to each other. The principal of these are the findings of Crozier and Wolf in contrast to the findings of the other investigators.

A new electronic circuit has been developed in which the duration of the light pulses in an intermittent stimulus could be regularly adjusted to any desired length, in addition to the frequency of intermittence and the duration of presentation to the observer. Because of the inconsistencies in the literature it was felt that a study of light-dark ratio utilizing this new circuit and thus affording a very precise specification of the stimulus conditions might possibly provide a basis for consolidation of the literature. The study was limited to the straight line relationships in order to permit the application of statistical procedures which would permit a quantitative interpretation of the results.

The source of luminance used in this study was a glow modulator tube (Sylvania Type R1131C). In order to obtain the critical threshold for flicker from the three trained observers, the pulse intensity or brightness was varied by using a calibrated neutral density wedge. The visual angle subtended by the test patch as viewed through a binocular stereoscopic microscope was 1.6 degrees. Each observer contributed 10 determinations for each of the 25 settings of light-dark ratio and frequency. The five light-dark ratios used were .01, .1, .2, .35, and .5, and within each light-dark ratio the five frequencies used were 20.4, 25.5, 30.7, 35.9, and 41.1 cps.

The analysis of variance indicated that 66% of the variance is attributable to frequency of intermittence, 32% to light-dark ratio, and 2% is distributed between replication, inter-individual comparisons, and the resulting 11 interactions.

When the light-dark ratios are plotted as contours on a F-log pulse I graph the relation for the smallest light-dark ratio, .01, is located at the highest light pulse intensity for any given frequency, the .1, .2, and .35 in that order next highest, with the .5 relation at the lowest pulse intensity. The relations of all light-dark ratios are essentially parallel, straight lines. The relationship log pulse I-log LDR is that of a negative decelerating curve. When perpendiculars are erected from the log pulse I axis of the F-log pulse I relations, the relationship of F-log LDR for the range of log pulse intensities from 0 to .6 is that of a negatively accelerated

curve, most probably a straight line reaching and asymptotic value at a light-dark ratio of .5 and a frequency of 41.1 cps.

Application of Talbot's law to the data resulted in a reversed ordering of the light-dark ratio contours on the F-log I graph, light-dark ratio .01 being at lower log I and LDR .5 at the higher log I, with the contours of .35, .2, and .1 interlacing with each other and falling in between.

These findings are the reverse of those of Crozier and Wolf and in partial reversal with those of Ross and of Erlick and Landis. A careful examination of the role of the various determinants of critical flicker fusion failed to provide an explanation for the contradictory evidence. It is concluded that some unspecified determinant or interaction of two or more determinants may have acted to reverse the ordering in the reported findings of these studies. The determinant, or interaction of two or more determinants, responsible for this reversal could not be suggested.

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THE EFFECTS OF VARIOUS KINDS OF RELEVANT VERBAL PRE-TRAINING ON SUBSEQUENT MOTOR PERFORMANCE

(Publication No. 4087)

Dorothy Elsey McAllister, Ph.D.
State University of Iowa, 1952

Seven groups of Ss, fourteen per group, were given one of three kinds of paired-associate pre-training prior to practice on the Star Discrimeter. The task on the Discrimeter was to learn to associate each of six colored light stimuli with one of six horizontal channels and to move a vertical response rod into the appropriate channel. The six channels, which radiate out from a center opening, are located at 60 degree intervals. Forty-five, 20-second trials separated by 10-second rest pauses were given. The performance measures obtained were number of correct responses and number of errors per trial.

One group of Ss, during irrelevant pre-training, learned to associate pairs of words which were unrelated to the motor task. During relevant S pre-training, another group of Ss learned to associate words unrelated to the motor task with stimuli which substituted for those used in the motor task. Five separate groups of Ss, during relevant S-R training, learned to associate the substitute stimuli with response words based on one of three analogues of the channels on the motor apparatus. A degrees, a clock, and a directions analogue were employed. Ss in the relevant S-R groups were instructed as to how the analogue could be utilized in performing the motor task. Two groups, given pre-training involving the clock analogue, practiced on a motor task involving a four-hour or an eight-hour rotation of the S-R relationships from those obtaining during pre-training.

The four hypotheses which were tested and the results pertinent to each follow.

1. Relevant verbal pre-training of the S-R type serves to facilitate subsequent motor performance over that of a relevant S control group. With one exception, the relevant S-R groups performed the motor task more proficiently than did the relevant S control group, thus furnishing support for the hypothesis.

2. The amount of facilitation of motor performance arising from relevant S-R pre-training depends on the kind of response words (that is, the analogue) utilized in pre-training. Significant differences, in terms of the correct response measure, were found among the three relevant S-R groups, thus substantiating the hypothesis. The use of the directions analogue led to significantly better performance throughout practice than did the use of the degrees analogue. During the initial trials, the group using the clock analogue performed more proficiently than did the group with the degrees analogue. The difference between the groups with the directions and the clock analogues was not statistically significant. The error measures furnished no support for the hypothesis.

3. The amount of facilitation arising from relevant S-R pre-training is inversely related to the amount of clockwise rotation of the S-R relationships from the pre-training to the motor task. No evidence in support of this hypothesis was obtained.

4. Relevant S pre-training serves to facilitate subsequent motor performance over that of an irrelevant pre-training control group. No evidence in support of this hypothesis was obtained. It was found, on the contrary, that the group given relevant S pre-training made a significantly greater number of errors at the outset of motor practice than did the irrelevant pre-training group.

Microfilm copy of complete manuscript of 84 pages, \$1.05. Enlargements 6" x 8", 10¢ per page.

THE PREDICTION OF PSYCHIATRIC DIAGNOSES BY SIGNS DERIVED FROM SCATTER ON THE WECHSLER-BELLEVUE ADULT INTELLIGENCE SCALE

(Publication No. 3982)

Benjamin Franklin McNeal, Ph.D.
University of Pennsylvania, 1950

The usefulness of signs based on scatter on the Wechsler-Bellevue Adult Intelligence Scale for predicting psychiatric diagnoses is studied by checking the effectiveness of Wechsler's signs of schizophrenia and by deriving a new set of signs on a statistical basis and checking them. The signs are evaluated by measuring the diagnostic properties of the individual sign, number of signs without regard to pattern, and pattern of signs.

The subjects are 340 white male veterans of World War II, half of them normals and half

hospitalized schizophrenics. These two groups are divided into pairs of groups for standardization and validation of the signs. The pairs of groups are equated in age and have identical distributions of claimed schooling and average Wechsler-Bellevue test score.

All of the work is based on difference scores obtained by subtracting the individual's average test score from each of his test scores. The new signs are derived by setting the limits of the sign in terms of difference scores so as to maximize chi-square of signs with group membership. Signs and cutting-points are derived on the standardization groups and checked on the validation groups. Patterns of signs are investigated by scalar analysis and multiple correlation of signs with the criterion group membership.

Only one of Wechsler's signs discriminates significantly between the validation groups, at the .05 level of confidence, but it identifies as schizophrenics more normals than schizophrenics. Two of McNeal's signs select schizophrenics of the validation groups significantly, at the .02 and .05 levels of confidence. Neither Wechsler's nor McNeal's signs discriminate significantly by cutting-point for number of signs, but McNeal's signs show a significant biserial correlation with the criterion, .27, critical ratio 3.00. Neither set of signs forms a scale. Both sets show too many unique patterns among the schizophrenics for non-scalar patterns to be useful diagnostically. There were 129 unique patterns of Wechsler's signs and 94 unique patterns of McNeal's signs among the 170 schizophrenics. Wechsler's signs fail to yield significant results from multiple correlation of signs with group membership, but McNeal's signs discriminated by the cutting-point method at the .01 level of confidence and show a significant biserial correlation, .208, critical ratio 2.14, with group membership.

It is concluded that the degree of relationship found is useful only in very large scale operations. Since the Wechsler-Bellevue Scale is not adaptable to such use, further use of signs or patterns of signs is not warranted. It is further suggested that in view of the long, unsatisfactory history of attempts to use scatter as a diagnostic aid on other intelligence tests, that further attempts to use intelligence test scatter for the aid of diagnosis are not warranted.

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THE ROLE OF THE CS-UCS INTERVAL IN CONDITIONING THE GSR

(Publication No. 4090)

George Otto Moeller, Jr., Ph.D.
State University of Iowa, 1952

This experiment was designed to study the relation between level of performance and the CS-UCS interval employed in the trace conditioning of the Féré GSR. In addition, an attempt was made to

determine the influence of adaptation to the UCS, and an hypothesized concomitant decline in motivation, upon GSR conditioning.

The CS was a "white noise," 20 db above each S's threshold. The UCS was an electric shock produced by the discharge of a condensor. Four conditioning groups, each trained with one of the following inter-stimulus intervals: 250, 450, 1000, and 2500 ms., and a pseudo-conditioning control were employed in the study of the inter-stimulus interval. Fifteen undergraduate men served in each group. All Ss served for two days, the first under a pseudo-conditioning regimen, the second in one of the five experimental groups. On the second day, each S received 23 conditioning trials, 8 test trials, and 4 extinction trials. The intensity of the UCS was increased systematically during each day's session.

Two additional groups, each composed of ten female and four male undergraduates, were conditioned with a 450 ms. inter-stimulus interval in an attempt to determine the effect of changes in intensity of the UCS upon performance. The strength of the UCS was systematically increased for one group, and maintained at a constant level for the other.

The following results were obtained:

1. In the study of the CS-UCS interval, the optimal interval was found to be 450 ms., shorter and longer intervals yielding poorer performance. This finding appears to indicate that the optimal interval for conditioning does not vary with the overt response being conditioned. It was suggested that differences in frequency of response were not significant due to the presence of pseudo-conditioned responses in the initial conditioning trials.

2. Systematic increases in UCS intensity did not alter the nature of the performance curves, nor delay adaptation of the UCR. The finding of 'atypical' performance curves in previous studies of the conditioned Féré GSR can probably be attributed to factors other than adaptation of the UCR.

The results were related to previous findings and their implications for learning theory discussed.

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PERFORMANCE ON SPECIAL ABILITY TASKS AS A FUNCTION OF LEVEL OF ABILITY AND MOTIVATING CONDITIONS

(Publication No. 4091)

Richard H. Mohr, Ph.D.
State University of Iowa, 1952

The purpose of the present study was to investigate the following problems:

- (a) The effects of success, neutral, and failure instructions on performance on four individually presented criterion tests.

- (b) The effects of presence or absence of a prestige figure at the test sessions upon performance on the criterion tasks.

- (c) The relationship of levels of ability, defined by scores on an initial battery, to performance on the criterion tasks.

- (d) The relationship of levels of anxiety, defined by scores on the Taylor Anxiety Scale, to performance on the criterion tests.

- (e) The effects of interaction between the above "levels" and "experimental" variables upon performance on the criterion tests.

The observations were obtained on a group of 117 freshman medical students in the first semester of their program. The "levels of ability" variable considered in this study was defined separately for each of the four criterion tasks by the subjects performance on an initial series of tests.

For the purposes of this study three main sources or indices of motivational level were considered. They were (1) verbal instructions, (2) presence or absence of an observer, and (3) score on the Taylor "Anxiety" scale. The first one of these, verbal instruction, involved statements to the subject either of success, neutral, or failure judgments about his prior performance. The observer condition, a social pressure motivational variable, involved the presence of the Dean of Students of the Medical College at some of the individual test sessions. The final index of motivational level, the "Anxiety" scale, consisted of a series of general descriptive statements of anxiety symptoms and yields a score which has been offered as an index of generalized manifest anxiety.

The class was arranged into twelve and eighteen groups representing divisions based on the two observer conditions, the three types of instructions and either the two anxiety levels or the three ability levels. Response times and frequency of correct response scores on the criterion tests were analyzed through three dimensional "Treatments by levels" designs using the analysis of variance technique.

The obtained results were as follows:

- (a) There were no significant effects in any of the analyses attributable to "instructions."

- (b) The effect of presence of the observer, significant only for the response time scores on the closure task, was to depress performance.

- (c) Positive and significant relations between the levels of ability variable and the frequency scores on the Span and Reasoning tests and time scores on the Reasoning and Fluency tests were obtained.

- (d) Significant but inverse relations between the levels of anxiety variable and the frequency scores on the Span and Reasoning tests were found.

- (e) A significant interaction was found between the observer conditions and levels of anxiety for the Closure frequency scores, with the "high" anxious groups performing more adequately when the observer was present.

On the basis of the above findings it is concluded that:

- (a) The general hypothesis that, mature students operate in any test situation at a relatively high motivational level which is not easily manipulated by changes in instructions or other stimuli, is consistent with the obtained results.

(b) The tendency of groups defined by levels on the Taylor anxiety scale to show different performance characteristics may be in part a function of either the task, the stimulus situation, or both.

(c) Time required to respond to the items of the Street Gestalt (Closure) test may be increased by the presence of a prestige figure in the test situation.

(d) Further experimental work on the relationship of motivational variables to test performance may well consider techniques for reducing motivation.

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AN EXPERIMENTAL INVESTIGATION OF THE EFFECT OF HUNGER DRIVE UPON THE BRIGHTNESS DISCRIMINATION LEARNING OF THE RAT

(Publication No. 4093)

Thomas Irvin Myers, Ph.D.
State University of Iowa, 1952

The investigation was conducted to obtain information concerning the influence of food deprivation interval (hunger) upon the performance of rats in a maze-type brightness discrimination problem. The study was designed to compare the performance of two hunger groups (4 and 21 hours deprivation) for each of several sets of special conditions.

A. Experiment I employed extensive pre-training to the spatial cues (right and left alleys) of a discrimination box with gray alleys. A total of 140 food-rewarded forced trials (70 to left and 70 to right alley) were administered to the 60 Ss constituting the four experimental groups of this portion of the investigation. One pair of groups, operating under 4 hour and under 21 hour hunger, was then trained with black as the positive cue of a black-white discrimination problem. The two remaining groups, under the same two hunger levels, were trained with white as the rewarded cue.

The results showed that:

(a) running speed on pre-training trials was not significantly related to deprivation interval,

(b) 21 hour deprivation produced greater variability than 4 hour deprivation in the number of errors made in learning to approach the black alley to a criterion of 18 correct of 20 trials,

(c) 21 hour deprivation produced smaller variability than 4 hour deprivation in learning to approach the white alley to the same performance criterion, and

(d) degree of hunger was unrelated to the average number of errors made by both the white and by the black trained groups.

B. Experiment II employed a procedure identical to that of Experiment I, except that no pre-training trials were given. Instead, an 8 day period of experimental inactivity for Ss of Experiment II

served as a control. The 60 Ss constituting the four parallel experimental groups of Experiment II were then begun on the black-white discrimination learning problem. As in Experiment I, one pair of 4 and 21 hour hunger groups was trained with black as the rewarded cue, and the other pair was trained to approach white.

The results showed that:

(a) degree of hunger was unrelated to the average number of errors made by both the white and by the black trained groups.

An analysis of the running speeds of the Ss in all the black positive groups of the study for the first two days of discrimination training showed that:

(a) pre-trained Ss of Experiment I has significantly shorter times than did the "naive" Ss of Experiment II.

(b) differences in the times of Ss performing under the two different hunger levels were not statistically significant.

For the particular conditions employed, the findings of the study indicated that hunger levels were unrelated to the performance of rats in the learning of a brightness discrimination problem.

The disagreement of the present results with those obtained in a similar non-spatial selective learning situation was pointed out. A review of animal learning studies involving the experimental manipulation of the food deprivation variable showed that factual inconsistencies have emerged from other types of selective learning situations. Consequently a need for further systematic experimentation in this area is clearly indicated.

Microfilm copy of complete manuscript of 59 pages, \$1.00. Enlargements 6" x 8", 10¢ per page.

THE EFFECT OF GROUP THERAPY UPON CERTAIN ASPECTS OF THE BEHAVIOR AND ATTITUDES OF INSTITUTIONALIZED DELINQUENTS: THE EVALUATION OF CERTAIN ASPECTS OF BEHAVIOR, AND ATTITUDES TOWARD SELF, OTHERS, AND SOME SOCIAL INSTITUTIONS FOLLOWING INTERVIEW GROUP THERAPY

(Publication No. 4147)

Howard Martin Newburger, Ph.D.
New York University, 1952

The Problem

This investigation was conducted in order to evaluate the effect of interview group therapy upon certain aspects of the behavior of institutionalized delinquent boys and their attitudes toward self, others, and some social institutions. The advanced type of experimental design that was used made possible the evaluation of other aspects of the therapy as well, and provided a more effective type of control than has been encountered in any previous study.

It was assumed that the period of three months, regularly allotted to group therapy within the

institution, was adequate for the therapeutic procedures to motivate changes in behavior and attitudes, if they were to occur, and that the measuring devices used would detect such changes.

Methodology

The research population was comprised of sixty consecutive admissions between the ages of sixteen and twenty-five. Six groups were established on the basis of sociometric selection. Three groups comprised the experimental group, and three the control group.

The population was consistent for social background, economic status, extent of recidivism, age, and intelligence. At the outset, no significant differences existed between groups for the seventeen variables measured, with the exception of the Haggerty-Olson-Wickman Behavior Rating Schedule and the work marks. The initially poorer standing of the experimental group for these two variables merely served to emphasize their later gains in therapy.

Experimental Design

The design called for the testing of both groups for the variables which were being measured. One group was then placed in group therapy, while the other enjoyed the same type of program with non-participation in therapy. At the conclusion of the three months of therapy, both groups were re-tested. The experimental group then was removed from therapy, and the control group was placed in therapy. When this was finished, both groups were again tested.

Results

Regardless of the time of administration, discipline and the scores on the Haggerty-Olson-Wickman Behavior Rating Schedule were improved by interview group therapy. When the therapy was administered without delay, work marks were improved, but became worse when the therapy was administered after a period of exposure to the institutional climate.

The attitudes toward self were significantly improved during the early phases of incarceration, regardless of group therapy participation. The attitude toward others was not improved until a later period.

When group therapy was administered without delay, it was noted that carry-over appeared to influence trends in favor of re-education to punishment. When group therapy was administered after exposure to the conventional institutional atmosphere, it was noted that the inmate expressed a need for punishment. Institutionalization without the prior support of group therapy appeared to influence a poorer performance on the Haggerty-Olson-Wickman Behavior Rating Schedule. In every case, the gains noted in the course of therapy continued in carry-over.

Discussion

When group therapy was administered without delay, it appeared to foster greater constructive

change. In terms of the sequence of the changes noted, support was given to the developmental theories of ego expansion. The two inconsistent philosophies represented by group therapy and traditional penology tended to confuse the inmates when they participated in group therapy after a delay, and apparently fostered a need for punishment. The success of any institutional program appears to be predicated upon a consistent approach endorsed by all personnel.

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ATTITUDES OF MOTHERS OF NEWBORN BABIES TOWARD THEIR BIOLOGICAL FEMININE FUNCTIONS

(Publication No. 4226)

Niles Rumely Newton, Ph.D.
Columbia University, 1952

Objective statistical methods were used to obtain and categorize women's feelings toward their biologically determined role. Two hundred and forty-six healthy mothers of healthy newborn babies were interviewed in the rooming-in wards of Jefferson Hospital. First a questionnaire was built up by successive revisions and testing on fifty-six mothers. Then 190 mothers were interviewed with the standardized interview form, and their replies were written down verbatim as nearly as possible. Extensive information from the medical case records was also available and a few of the mothers were given Terman's M-F test and questioned about their feelings toward sexual intercourse.

The women's answers to the questions were individually categorized by a judge who did not know the women, their case records, or what they had answered to the other questions. Since there was a slight difference in nature of the replies given by women interviewed second in the room or during the later part of the puerperium, the final statistical analysis was done on the 123 mothers who were interviewed first in the room and on the first and second postpartum days. Phi coefficients and probabilities were calculated, after the material had been placed in dichotomous categories.

Women who expressed positive feelings about menstruation tended to have less menstrual pain ($\phi .45$, $p.01$), more normal births ($\phi .22$, $p.02$) and more children ($\phi .27$, $p.01$). They also tended to be elder women ($\phi .30$, $p.01$) who were less willing to welcome more babies ($\phi -.29$, $p.01$).

Women who expressed positive feelings about pregnancy tended to be younger ($\phi -.22$, $p.02$) and to have no wish to be men ($\phi .23$, $p.02$).

Women who expressed positive feelings about breast feeding tended to express positive feelings about birth ($\phi .28$, $p.01$) and to be breast feeding without formula supplementation six weeks after birth ($\phi .38$, $p.02$).

Women who expressed positive feelings about care

of their babies tended to express positive feelings about birth (ϕ .25, p.01), to report a more copious menstrual flow (ϕ .31, p.01) and to have more children (ϕ .27, p.01).

Women who expressed the desire to be men tended to express negative feelings toward pregnancy (ϕ .23, p.02) and to be older (ϕ -.24, p.01).

Women who expressed the feeling that men have a more satisfying time in life tended to report a more copious menstrual flow (ϕ -.29, p.01).

These findings, in conjunction with the findings of other objective research studies that were reviewed, led to the following conclusions:

1. Women who express positive feelings about birth may also tend to express positive feelings about breast feeding and care of their babies. Women who express the wish to be a man may tend to express negative feelings toward pregnancy.
2. Women who express positive feelings about their biological role may also tend to be more adequate in their female physiological functions, and may tend to have more children. However, women who are satisfied with women's role in modern culture tend to menstruate less copiously.
3. In considering the problems and psychology of women it may be useful to distinguish between biological and cultural femininity. These two types of femininity may be opposed to one another in some ways.

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AN INVESTIGATION OF THE PROBLEM OF ACADEMIC UNDERACHIEVEMENT AMONG INTELLECTUALLY SUPERIOR COLLEGE STUDENTS

(Publication No. 4149)

Samuel Pearlman, Ph.D.
New York University, 1952

The purpose of this study was to investigate certain physical, psychological, and sociological factors associated with the marked academic underachievement of a group of intellectually superior college students; and to determine the extent to which these factors differed significantly from those evidenced by an intellectually comparable group of college students with high-level academic performance.

The two groups were established from a distribution of the first-year scholastic indices of all freshmen entering Brooklyn College for the first time in 1949, who had attained total scores on the ACE Psychological Examination of 140 and above (91st percentile or higher on the national norms). All individuals on campus in September, 1950, except three, who were within the top and bottom thirty per cent (Achievers and Underachievers, respectively) of this distribution constituted the subject groups. As finally determined, the Achievers'

and Underachievers' groups each consisted of twenty-five men and thirteen women, with a mean age for both groups of approximately nineteen years. The mean scholastic index of the Achievers was 3.499 (B+), of the Underachievers 1.775 (C-).

The groups were compared statistically on factors of their academic background, health status, family organization, vocational interests and objectives, and general adjustment. The Kuder Preference Record was introduced to gauge vocational interests, and the general adjustment of the subjects was evaluated by the application of the Davidson and the Munroe rating techniques to individual Rorschach protocols.

While the two groups had been achieving scholastically at about the same level prior to high school, thereafter the academic balance between them turned off-center, the shift in favor of the Achievers continuing sharply into the college period. The Achievers proved also to be the more active and rounded group in extracurricular endeavors, except in the area where competitive physical expression was a keynote.

Neither the medical-examination data nor the physicians' health ratings were able to differentiate significantly between the groups. No reliable differences, moreover, were observed on the variables of family size, sibling patterns, religious affiliations, intactness of the parental structure, parental ages and nativity, home-language usage, parental occupations, and family income. On the factor of parental education, however, the data took a reliably different turn: the Achiever was more likely to be found in a family where the father had undertaken studies beyond the baccalaureate level or where the mother had gone onto at least the high school level of education.

While the Kuder data did not differentiate between the female subgroups, the interest patterns of the male Achievers were observed to focus on activities of an intellectual and research character, which was paralleled by a positive social service emphasis; those of the male Underachievers were characterized by more manually toned elements, supplemented by a strong persuasive trend. About as many in each group were found to maintain professional-level objectives which, for the Underachievers, indeed represented a failure to take their academic circumstances into realistic account.

Neither the Davidson signs nor the Munroe ratings, applied to the Rorschach records, brought out reliable differences between the groups. Good and poor adjustment characterized both group patterns: high achievement was not found always to be associated with good mental health, and low achievement was found not necessarily to be symptomatic of poor emotional balance. The subjects of both groups showed an inner reserve of power which was either not being tapped or else was being inhibited by their present experiences; but significantly more Achievers than Underchievers were found to be using their capacities to advantage.

Microfilm copy of complete manuscript of 434 pages, \$5.43. Enlargements 6" x 8", 10¢ per page.

PATTERN OF ABILITIES IN CHRONIC SCHIZOPHRENICS

(Publication No. 4230)

Marjorie Fingerhand Pfeffer, Ph.D.
Columbia University, 1952

Thirty-two chronically ill schizophrenic patients were given a variety of psychological tests before 23 received brain surgery. A three and a half year followup study revealed that of the total number of patients twelve were improved, fifteen were unimproved, and five had a partial remission of their psychoses. An analysis of the intercorrelations of twenty-four tests, given to these patients before the followup study, was made in order to determine 1) the pattern of abilities in this group of patients and 2) whether the obtained structural patterns relate to eventual outcome of illness in the forty-two month followup study.

A factor analysis of the correlation matrix revealed three independent factors which accounted for 51% of the total test variability. These factors were described as verbal intelligence, a conceptual ability factor, and a perceptual ability factor. Estimated factor scores for all of the patients showed that those whose psychosis improved, the unimproved, and the intermediate outcome group were not significantly different when each factor was considered individually. This was true for each of the three outcome groups. When the three factor scores were combined for each individual, a significant association between outcome and overall factor score was obtained. Patients whose verbal and conceptual factor scores were low in relationship to their perceptual factor score were more likely to be in the improved group than those whose verbal and conceptual factor scores were high relative to their perceptual factor score. This finding must be regarded as tentative until cross validation material becomes available.

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THE ABSOLUTE THRESHOLD OF ONE EYE AS A FUNCTION OF THE MAGNITUDE AND DURATION OF LIGHT IN THE OTHER EYE

(Publication No. 4231)

Robert Plutchik, Ph.D.
Columbia University, 1952

An apparatus was constructed and used to determine the absolute threshold of the right eye while different magnitudes of light, ranging from .3 to 30,000 millilamberts, were presented to the left eye.

Two subjects were used in the first experiment. After at least a four-minute adapting period with the left eye at each intensity level, the absolute threshold was determined in the right eye, by the method of limits, using an exposure time of one-one

hundredth of a second. It was found that there was a small but consistent rise in the absolute threshold of the right eye over a range of .4-.5 log units as the adapting intensity in the left eye was increased over a range of 8 log units.

Both subjects were also used to get "time-course" data, i.e. the change in the absolute threshold with time, after the introduction of the adapting field to the non-test eye. These curves showed an initial mean threshold for the first thirty seconds about the same in value as the mean threshold determined after the four-minute adapting period in experiment I. The specific changes within the four-minute period suggested a cyclical fluctuation, with a decrease in the threshold after the first half-minute and a subsequent rise at about three minutes.

Three more subjects were run at a single intensity level to try and determine a more reliable curve. These also indicate a cyclical fluctuation, but the results, although suggestive, are not conclusive.

The relation of the findings to previous work, both psychophysical and neurological is noted.

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INFLUENCE OF FAILURE, EXPRESSED HOSTILITY, AND STIMULUS CHARACTERISTICS ON VERBAL LEARNING AND RECOGNITION

(Publication No. 4107)

Joseph George Smith, Ph.D.
State University of Iowa, 1952

The experiment was concerned with the effects of and interactions among the following three variables as they are reflected in paired associate learning, visual recognition thresholds, and performance on a multiple choice Thematic Apperception Test: (1) failure, experimentally induced by verbal instructions; (2) expressiveness or repressiveness in relation to hostility; and, (3) need-relatedness of stimuli.

One hundred and twelve Introductory Psychology students, selected on the basis of their scores on the Psychasthenia and Hysteria scales of the Minnesota Multiphasic Personality Inventory and on the Moldawsky Hostility Scale, were employed as subjects. Each subject was categorized as hostile-expressive or non-hostile non-expressive and was assigned randomly to one of two conditions (stress or non-stress) and to one of two lists of paired associates, (hostile or neutral).

The following were among the findings: (1) stress resulted in an impairment of learning which persisted throughout the series of 15 trials; (2) differences in response to hostile and neutral materials appeared to depend, in part, on the amount of hostility (or expressiveness); (3) the effect of failure on hostile-expressive individuals was seen to be different for hostile and neutral materials.

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THE RELATIONSHIP BETWEEN ATTITUDES
TOWARD CERTAIN AUTHORITY FIGURES AND
JOB STABILITY IN A GROUP OF
PSYCHONEUROTIC VETERANS

(Publication No. 4151)

Murray Jack Stern, Ph.D.
New York University, 1952

The Problem

The purpose of this study was to determine the relationship between attitudes toward certain authority figures and job stability. The attitudes were studied in terms of content and structure. Firstly it was hypothesized that the attitudes of those who failed to hold jobs would express greater aggression and independence toward authority figures while a group of individuals who succeed in holding jobs would express greater dependence upon authority figures. Secondly it was hypothesized that the job failure group would tend to generalize these attitudes toward authority figures to a greater extent than the job success group. Thirdly it was hypothesized that the job failure group would show larger discrepancies between their surface attitudes and deeper lying attitudes than the job success group.

The Related Literature

The literature concerning vocational maladjustment is undergoing a shift in focus from job orientation to worker orientation. Such authors as K. Menninger, English, Pearson, and Henry, see the problem worker in a more clinical light. The problem worker is now considered to have inter-personal difficulties. The core difficulty in this respect is thought to be located in the attitude toward authority.

Procedure in Collecting Data

A questionnaire was constructed to measure the surface attitudes toward authority. The instrument was composed of 216 items, 144 of which measured the attitudes toward six authority figures: boss, policeman, father, officer, judge, and teacher.

A modified form of the Thematic Apperception Test was developed to measure attitudes on a deeper, less conscious level. Five picture situations were drawn, each depicting an authority figure (mentioned above) interacting in an ambiguous way with a subordinate figure. For the father-son situation card 7BM of the original Murray set was used.

Sixty white male veterans between the ages of 21 through forty, each carrying a diagnosis of psychoneurosis constituted the population. Their I.Q. scores ranged between 90 through 135. The groups were differentiated on the variable of job stability so that thirty men meeting the criteria for job failure formed the experimental group while thirty men meeting the criteria for job success formed the control group.

The Results

By use of t tests it was established that the job failure group expressed more aggression and independent attitudes toward authority figures while

the control group expressed more dependence upon authority.

Secondly the job failure group generalized the attitude of aggression while the control group generalized dependency to a greater expression than the experimental group. Both groups generalized independence to similar extents.

Thirdly the experimental group showed significantly larger discrepancies between conscious attitudes and deeper lying attitudes.

Analysis of three themes that occurred most commonly in the TAT stories showed that the job failure group sees authority figures as less nurturing than the job success group. The experimental group tends to see authority as more dominant. Both groups see authority as punitive with similar frequency.

Summary and Conclusions

It can be concluded that a significant relationship exists between attitudes toward authority figures and job stability. Specifically, certain attitude constellations are related to the ability to hold a job, namely dependence upon authority with a corresponding control of aggression and strivings for independence. This holds for neurotics.

The neurotic individual generalizes that attitude which is his chief character defense or his typical way of reacting to authority. The father appears to be the prototype for these reactions in that attitudes toward him correlate most highly with attitudes toward the rest of the figures used.

The neurotic job success individuals appear to have more awareness of certain attitudes in most situations and this is probably related to their better ability to control aggression and appease authority.

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DURATION THRESHOLDS IN THE
PERCEPTION OF UNPLEASANT WORDS

(Publication No. 4034)

David Morris Sterne, Ph.D.
Michigan State College, 1952

This study attempts to investigate the role of stimulus unpleasantness in visual perception, in interaction with certain other variables. The primary hypothesis was that the temporal thresholds for the perception of idiosyncratically unpleasant words would be significantly higher than those words of neutral affective connotation. These "duration thresholds" were determined by the number of tachistoscopic presentations at regularly increased exposure durations required for word recognition.

It was postulated that raised duration thresholds would occur with words idiosyncratically relevant in terms of unpleasant personal experiences and associations. The thresholds were also assumed to be affected by differences in word length and familiarity.

It was therefore essential to show that the thresholds for the unpleasant words were higher than those observed for "control" words of neutral affective character, equated in terms of number of letters and frequency of appearance in reading matter.

A secondary hypothesis predicted that pre-recognition responses made to the unpleasant words would differ from those made to the matched control words in regard to the frequencies of structurally similar, structurally unlike, nonsense, and part responses. Five subsidiary hypotheses predicted the following differences, in terms of the relationship between unpleasant words and matched controls:

- (1) Words selected through peer group ratings as strongly disliked would have higher duration thresholds than words selected as mildly disliked.
- (2) Words chosen through predictive ratings by psychologists as strongly socially taboo would have higher thresholds than those chosen as mildly taboo.
- (3) Words rated least liked by the subjects would have higher thresholds than words rated next least liked.
- (4) Uncommon unpleasant words would have higher thresholds than common unpleasant words.
- (5) Long unpleasant words would have higher thresholds than short unpleasant words.

Various procedures for selecting critical stimulus words which could reasonably well be assumed to have definitely unpleasant significance for the individual were examined. The most satisfactory, the individual's rating of lists of words selected as definitely unpleasant by peers of the two groups of subjects used, was adopted. Thirty-two general hospital patients and thirty-three college students were used as subjects.

Two unpleasant words were rated as least liked and next least liked of the appropriate word list by each subject. These words and four matched control words for each of the two unpleasant words were shown to the subjects in a Gerbrands Mirror Tachistoscope, with three exposures at each setting beginning with .01 seconds, with increments of .01 seconds until word recognition occurred. All responses and thresholds were recorded.

With the students alone, common unpleasant words were perceived significantly faster than uncommon unpleasant words or matched controls, and peer group mildly disliked words were perceived significantly slower than strongly disliked words or controls. Very significant differences in pre-recognition hypothesis frequencies were obtained with unpleasant as compared to control stimulus words with the patients but not with the students. No other significant differences between unpleasant and control words were found. It was concluded that word unpleasantness significantly influences duration thresholds only with certain individuals or groups under specific conditions of interaction with other variables.

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A MULTIDIMENSIONAL ANALYSIS OF SOCIAL ATTITUDE WITH SPECIAL REFERENCE TO ETHNOCENTRISM

(Publication No. 4015)

George John Suci, Ph.D.
University of Illinois, 1952

Work in the measurement of meaning has led to a measuring instrument which can give a multidimensional picture of peoples' conceptions of objects. Subjects are required to make judgments on a set of seven point scales each defined by a pair of polar terms. The totality of scales used represents a group of independent judgmental dimensions. The most prominent dimension of judgment has been shown to be the valutive, or attitudinal dimension. The purpose of this investigation was to relate the attitudinal dimension to other dimensions of judgment by use of the measuring instrument described.

As a guide to some of the significant aspects of this problem three hypotheses were derived from literature on "ethnocentrism." (1) Relations among scales show (a) fewer independent dimensions, and/or (b) more variance attributable to the valutive dimension for high ethnocentric subjects than for low ethnocentric subjects. (2) The valutive component accounts for a greater proportion of the total discrimination between judged concepts for high ethnocentrics than for low ethnocentrics. (3) The relations among judgmental scales change less from concept to concept for low ethnocentrics than for high ethnocentrics.

High and low ethnocentric subjects were the upper and lower fifths of a distribution of scores on the Levinson Ethnocentrism Scale. These subjects also rated six ethnic concepts (NEGRO, FRENCHMAN, MEXICAN, JEW, ENGLISHMAN, GERMAN) on sixteen scales defined by polar terms (e.g., cooperative-obstructive, childish-mature, intelligent-stupid). Intercorrelations between scales were found by first holding constant mean differences among concepts, and then summing across subjects and concepts. These matrices of correlations, one for each experimental group, were factor analyzed to test the first hypothesis. Six factors were found for each experimental group. The valutive factor was identified by rotating into simple structure. The percent variance attributable to this factor was equivalent for both groups. The first hypothesis was rejected on the basis of these results.

The second hypothesis was tested by use of D , a new measure of relation among variables. D 's between every ethnic concept and every other ethnic concept were found for each experimental group. That portion of each D attributable to differentiation among ethnic concepts on the valutive dimension was calculated. These values were compared for the two experimental groups. The difference was statistically insignificant. Thus, the second hypothesis was rejected. In relation to this test, it was found that differentiation among concepts on the valutive dimension by high ethnocentrics was statistically significant, but not so for the low ethnocentrics.

When the rank order of the ethnic concepts on the valuative dimension was plotted on the abscissa and a measure of the extent of \bar{D} between the ethnic concept and all other concepts due to valuative differentiation was plotted on the ordinate, a U-shaped function was produced for the high, but not for the low, ethnocentrics. This shows that for concepts extremely valuated, either positively or negatively, the valuative dimension is relatively more dominant.

The third hypothesis was tested by finding \bar{D} between scales for each ethnic concept for each experimental group. The \bar{D} -values for each concept were correlated with the \bar{D} -values for every other concept within each experimental group. These intercorrelations were higher for the low ethnocentrics than for the high ethnocentrics, indicating more constancy of scale relations for the low than high ethnocentrics.

These results were discussed in relation to the theory of ethnocentric ideology and in relation to the feasibility of multidimensional measurement of attitudes.

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AN INVESTIGATION OF CONDITIONS AFFECTING TRANSPOSITION BEHAVIOR OF PRESCHOOL CHILDREN

(Publication No. 4110)

Glenn Terrell, Jr., Ph.D.
State University of Iowa, 1952

This study was concerned with the effects of differential preliminary training procedures and mental age levels, plus any interactions between training procedures and mental age levels on discrimination and transposition behavior of preschool children. Forty-eight subjects were divided into four mental age levels. The subjects within each level were randomly assigned to four treatment groups, making a total of sixteen treatment-level combinations of three subjects each. The experiment was divided into four parts: preliminary training, initial test, training session, and final test. The preliminary training and the initial test were given on the first day, while the training session and the final test were given on the next day, or as soon as possible thereafter.

The materials for the preliminary training session were plane geometric figures; triangles, circles, and trapezoids, pasted on white background cards. Each subject of treatment I was given an equal number of reinforcements (12) on all sizes of stimuli; small-sized, middle-sized and large-sized, and the instructions were that the subject was to put his finger on one of the stimuli. Each subject of treatment II was given the same instructions as those of group I, but was reinforced on the middle-sized stimulus only. Each subject of treatment III was told to put his finger on the "dag" stimulus,

and was reinforced only when he responded to the middle-sized stimulus. Each subject of treatment IV was told to say "dag" and then to put his finger on the "dag" stimulus, after which he was rewarded only when he responded to the middle-sized stimulus. Reward during the preliminary session was a verbal response "That's right."

Immediately following the preliminary training, the subjects were given an initial transposition test, the stimuli being three cube boxes their respective sides having the areas of 4, 8, and 16 square inches. The instructions during the initial test were the same as those during the preliminary training, though there was no reinforcement of any kind during the initial test.

In the third phase (training session), all subjects were given identical training (specific training on the concept, "middle-size"). The materials were three cube boxes, their respective sides having the areas of 2, 4, and 8 square inches. The subjects were required to learn a response criterion (8 of 10 correct or 6 consecutive correct) the selection of the middle-sized box. Prior to the first trial, and prior to every 10th trial thereafter, the subjects were informed that the correct box was the dag box.

In the last phase of the experiment (final transposition test) the subjects were given the same test as in the second phase. Immediately following the final test each subject was asked to verbalize the basis of his response on the final test.

The results of the initial test showed that treatments II, III, and IV made a significantly greater number of responses to the middle-sized box than did treatment I. There were no significant treatment differences with respect to the number of trials to reach the training criterion, nor with respect to the mean number of responses to the middle-sized stimulus on the final test. It was found that transposition behavior of these subjects was in part affected by whether or not the child has a verbal name available for the concept, as evidenced by the fact that those who knew the concept middle-size when told to "Say dag and then put your finger on the dag box" tended to respond to the absolute stimulus.

It was also found that those who commented on the change of boxes prior to the final test tended to respond to the absolute box, the difference between this group and those not commenting being significant.

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AN EVALUATION OF MASSETER MUSCLE ACTION POTENTIALS IN STUTTERED AND NON-STUTTERED SPEECH

(Publication No. 4117)

Dean Elmer Williams, Ph.D.
State University of Iowa, 1952

The purpose of this study was to compare young adult stutterers and non-stutterers with respect to bilaterally recorded action potentials of the jaw (masseter) muscles.

The hypothesis tested was that any electromyographic differences between stutterers and non-stutterers obtained under the conditions of the present study may be accounted for by reference to variations in patterns of jaw movement, and to differences in electrode placement.

Bilateral masseter muscle electromyograms were recorded, by means of surface electrodes, from 15 stutterers and 15 non-stutterers during specified conditions of speech and during instructed jaw movements without speech. Two sets of electrode placements were used for each subject.

Each non-stutterer spoke a total of 20 words. Ten of these were spoken normally and ten were spoken with imitated stuttering. Each stutterer spoke words until he had stuttered on ten of them and until he had said ten words without stuttering. In addition, each stutterer again spoke words until he had stuttered on six of them in an instructed stuttering pattern of easy relaxed repetitions of the first syllable of the word.

The jaw movement sample consisted of a series of instructed jaw movements and was obtained from both stutterers and non-stutterers.

Records of each subject were analyzed for bilateral amplitude differences (amplitude from the left jaw greater, right jaw greater, or bilateral equality), differences in bilateral instant of appearance (action potentials from the left jaw preceding those from the right, those from the right jaw preceding those from the left, and bilateral simultaneity), spikes, and reversals of amplitude differences during the speech samples or during the instructed jaw movements.

The two groups were compared for the various conditions of speech and the differences between means were tested by t-tests.

There were no significant differences between the stutterers and non-stutterers for either bilateral differences in action potential amplitude or in bilateral differences in instant of appearance. However, stutterers during stuttering speech had significantly more words per subject that showed spiking on the EMG record than did the non-stutterers during normal speech. Also, the results from one electrode placement, but not the other one, indicated that more words per subject contained reversals of amplitude differences during the stuttered speech of stutterers than during the non-stuttered speech of non-stutterers. However, when the non-stutterers imitated stuttering, the corresponding EMG record showed significantly more of both anomalies, i.e.,

spikes and reversals, than occurred during even the stuttered speech of stutterers. In contrast, when the stutterers used an instructed easy repetitious method of stuttering, the mean number of words per subject that showed these anomalies was reduced to a level where it did not differ significantly from that of non-stutterers during normal speech.

The main indications of the jaw movement data were that specific action potential anomalies could be produced and could be made to vary in frequency of occurrence by properly instructed jaw movements. This was true for both stutterers and non-stutterers.

It was concluded that while the EMG pattern certainly must reflect preceding motor neurone activity, this does not imply that stutterers and non-stutterers are basically, i.e., neurophysiologically, different from one another in the manner implied by earlier EMG research.

The observable differences in action potential response between the two groups appear to reflect, only, that moments of stuttering are accompanied by muscular tension and by patterns of jaw movement that differ from those obtained during normal speech.

Microfilm copy of complete manuscript of 89 pages, \$1.11. Enlargements 6" x 8", 10¢ per page.

ZOOLOGY

THE METABOLISM OF NORMAL AND THYROXIN-STIMULATED RANA PIPPIENS SKIN

(Publication No. 4044)

Stephanie Henoch Barch, Ph.D.
State University of Iowa, 1952

The metabolism of isolated Rana pipiens skin was studied. All measurements of the metabolism were obtained by the direct method of Warburg. The metabolic rate of skin from 101 normal tadpoles, juveniles, and adults showed a clear trend of increase to a maximum at metamorphic climax and a later decrease to the adult level.

Forty-six animals, stages VII through XII, were placed into 1:10,000,000 thyroxin solution for 48 hours. The metabolism of their skins at stages IX through XIV was compared with the metabolism of 45 normal skins for these stages. In all stages, considered together, there was a significantly higher metabolic rate for the experimental animals as compared with the control normal animals. The effect of the thyroxin treatment was not significantly different from stage to stage.

Five pellets of 20% thyroxin in cholesterol were implanted subcutaneously into the right side of each of 14 pairs of animals, stages VII - XII. Cholesterol control pellets were implanted on the left side. After 72 hours, at stages IX - XIV, the metabolic rate on the right side was found to be significantly higher than that of the left side. This shows that the

metabolism of the entire skin is dependent not only on the thyroxin concentration in the body as a whole but is also affected locally by a spatially restricted treatment with thyroxin.

The metabolic response to thyroxin treatment precedes the morphological response.

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LOCAL ACTION OF THYROXIN ON METAMORPHOSIS OF THE AMPHIBIAN GUT

(Publication No. 4045)

David G. Barry, Ph.D.
State University of Iowa, 1952

The investigations were made to determine whether the duodenum of the early *Rana pipiens* larva is competent to react to local action of the thyroid hormone. If such reaction could be brought about, it would indicate that, in the case of the duodenum, metamorphosis is probably a result of the response of individual cells or cell groups rather than of the whole organ.

The changes in the histology of the gut of *Rana pipiens* in normal metamorphosis were compared with the changes described by Janes in *Rana clamitans* (1934). Involution in the animals is similar but not identical.

Pellets containing thyroxin (20 per cent by weight) in cholesterol were placed adjacent to the duodenum in animals of early and mid-larval stages (IV through XII). They caused local loss of cilia after three days' time, with slight acceleration of general body metamorphosis. After six days, they caused loss of cilia, typical disorganization of the epithelium, and thickening of the muscle layers. The greatest effects were still localized, and only slight general acceleration was seen. Nine days after implantation of the pellets, some animals showed marked acceleration of metamorphic events including uncoiling of the gut. The histology of the duodenum, however, was still more advanced when compared with normal animals than the external stage of the body would indicate. In contrast, other nine day animals showed but slight external stimulation, and displayed the same sort of duodenal changes as were noted after six days. The variable thyroxin content of the pellets was probably responsible for the differences seen at 9 days.

Three aspects of metamorphosis were investigated in detail: increase in mitotic rate, change in proportions of the nuclei of the columnar epithelium, and thickening of the circular muscle layer. In all experimental cases, these changes were of greatest magnitude in the region of the pellet and showed a gradient decrease as the distance from the pellet site increased. Cholesterol control pellets implanted in other larvae of comparable stages induced no very significant changes.

It may be concluded that the duodenum of the

Rana pipiens larva in the early stages (IV) is competent to react to concentrations of thyroid hormone which are larger than those normally found in the blood stream in the early and mid-larval stages (up to stage XIV). The duodenum probably metamorphoses as a result of the direct action of the thyroid hormone in the normal animal. The results further suggest that the various parts of the gut probably metamorphose synchronously in the normal animal because they have comparable capacities to react and because they are exposed to the same concentration of thyroid hormone in the blood.

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PARABIOSIS AND GONAD TRANSPLANTATION IN *XENOPUS LAEVIS* DAUDIN

(Publication No. 4054)

Chih Ye Chang, Ph.D.
State University of Iowa, 1952

Partial sex reversal from female to male occurs in heterosexual parabiotic pairs of *Xenopus*, involving reduction of the ovarian cortex and hypertrophy of the medullary cords. Gonad transplantation permits combining hosts and donors of different ages. The transplant is grafted either into the body cavity or in the head behind the eye.

The combination of host and donor of same age after the middle larval stage retard general ovarian development but do not result in sex reversal five to six months after the operation. Similarly limited are the effects of grafts of adult testis into larval and adult females. However, testes of immature males cause complete sex reversal if implanted into female tadpoles during the first half of the larval period. Small testicular nodules have been induced to form in the gonads of such female hosts.

The results emphasize the importance of time or age factors in embryonic induction of sex differentiation. It is shown that sex reversal is most readily induced when the ovarian cortex is maximally susceptible to heterosexual interference. It is also found that inductive potency of the medullary inductor of the male reaches a maximum after metamorphosis and then falls off toward sexual maturity. These experiments further support the contention that inductor substances of sexual differentiation are not sex hormones.

Microfilm copy of complete manuscript of 48 pages, \$1.00. Enlargements 6" x 8", 10¢ per page.

THE INFLUENCE OF DIRECT CURRENT FIELDS UPON THE DEVELOPMENTAL PATTERN OF THE CHICK EMBRYO

(Publication No. 4059)

Naoma Jean Dimmitt, Ph.D.
State University of Iowa, 1952

This is an exploratory attempt to evaluate the effects of a wide range of field strengths and current exposure times upon the chick embryo in situ or explanted at various developmental stages. None of the current densities ($3\text{--}167\ \mu\text{a}/\text{mm}^2$) employed were lethal, i.e., the viability of controls and experimentals was virtually the same. The orientation of the embryonic axis with respect to the external field was a critical factor; the frequency of abnormal embryos was least when the embryonic axis was parallel to the current axis with the head to the cathode, greater when the embryos were at right angles, and largest with anodally oriented embryos. The type of abnormality induced by the current was correlated with the developmental stage at initial exposure; abnormalities induced in embryos of less than thirty hours previous incubation included cephalic retardation, caudal expansion, non-fusion of the cardiac primordia, general body retardation and monsters. Abnormalities in older embryos were limited to heart displacement, diminution or loss of flexures and caudal malformation. The influence of field strength and duration of current exposure was ascertained by computing the work done per unit volume of medium; there was an increasing frequency of abnormal embryos with an increase in work expenditure.

Microfilm copy of complete manuscript of 72 pages, \$1.00. Enlargements 6" x 8", 10¢ per page.

STUDIES ON A HYBRID FROG EMBRYO

(Publication No. 4193)

Eugene Alva Healy, Ph.D.
Columbia University, 1952

The hybrid *R. pipiens* ♀ x *R. clamitans* ♂ is compared with the normal embryo *R. pipiens* ♀ x *R. pipiens* ♂. The two embryos do not differ before gastrulation; and after the onset of gastrulation they differ only morphologically, not in any phase of metabolism investigated. The blastopore begins to form after about 42 hours incubation at 14°C. The morphogenetic development of the hybrid ceases almost immediately after the beginning of the dorsal lip appears and remains as a healthy "arrested gastrula" until gastrulation is completed in the normals. Toward the end of this period the animal hemisphere becomes rough or irregularly pitted. When the neural plate begins to form in the normals a scattered cytolysis appears in the hybrids and progresses slowly to complete cytolysis by the time the normal neural tube is closed or the tail bud formed.

In favorable material, where the vegetable hemisphere is light in color and contains little pigment, it is possible to compare the size, shape and number of cells. The nuclei of these cells are surrounded by clusters of pigment granules so it is possible to recognize anaphase and telophase of dividing cells. Comparison is not feasible after the lateral and ventral lips of the blastopore are formed. Before this there is no difference between hybrid and normal cells except for the normal cells which are undergoing invagination. The invaginating cells and those being covered by the advancing blastopore lips undergo a characteristic change in shape. This is found only transitorily in the hybrid cells forming the abortive dorsal lip.

Respiration in the hybrid does not differ in any from the normal before the beginning of cytolysis. During gastrulation the R. Q. is near unity. The average rate of oxygen consumption in both forms is about 125 cubic microliters per 100 eggs per hour at 17.6°C., at the beginning of gastrulation; and it gradually increases, but in an irregular manner, to about 175 mm³/100 eggs/hour at the end of gastrulation.

A protein fraction extracted with 10% sodium chloride at pH 6.8 from late cleavage eggs splits more phosphate from ATP (about 20 micrograms per 8 eggs per one hour incubation at 27.8°C. than a similar extract from late gastrula eggs (about 12 micrograms/8 eggs/hour). A water extract (pH 8.6) showed no such consistent difference. The average amount was about 30 micrograms/8 eggs/hour.

About 5 micrograms/8 eggs of a water soluble inorganic phosphate (pH 8.6) can be extracted from the gastrulae; and about 5 micrograms/25 eggs of trichloroacetic acid-soluble labile phosphate together with about 4 micrograms/25 eggs of acid-soluble inorganic phosphate can also be obtained.

In all the metabolic studies (respiration, apyrases, phosphate) there were greater differences between clutches of eggs (hence the above values are given as approximate) than between hybrids and normals from the same clutch. The differences were neither consistent nor statistically significant to enable one to distinguish hybrid from normal.

This hybrid is unusual in the fact that its development is arrested without a corresponding arrest in respiration. No correlation could be found between the morphologic block and respiration of any of the phases of phosphate metabolism investigated.

Microfilm copy of complete manuscript of 56 pages, \$1.00. Enlargements 6" x 8", 10¢ per page.

THE LIFE CYCLE OF THE FISH
ACANTHOCEPHALAN, POMPHORHYNCHUS
BULBOCOLLI (LINKINS) VAN CLEAVE 1919,
WITH SOME OBSERVATIONS ON
LARVAL DEVELOPMENT IN VITRO

(Publication No. 4128)

Thorkil Jensen, Ph.D.
University of Minnesota, 1952

Preliminary laboratory experiments were performed to determine suitable intermediate and definitive hosts for the fish acanthocephalan, Pomphorhynchus bulbocolli.

A number of invertebrate animals, Hyalella azteci, Gammarus sp., Asellus sp., Estheria sp., Helisoma trivolvis, dragon fly naiads, and ostracods were exposed to the eggs of Pomphorhynchus. Only the amphipod, Hyalella azteci, proved to be a satisfactory intermediate host for this acanthocephalan. Five species of fish, Catostomus commersonnii, Moxostoma aureolum, Semotilus atromaculatus, Nocomis biguttatus, and Ambloplites rupestris, and two species of amphibians, Rana pipiens and Ambystoma tigrinum, were selected as potential definitive hosts. Hyalella experimentally infected with Pomphorhynchus were fed to these vertebrates. Fifteen of sixteen common suckers, Catostomus commersonnii, which were autopsied over a period of ten weeks were found to harbor Pomphorhynchus bulbocolli in their intestines. Six of ten Ambloplites rupestris and seven of twelve Moxostoma aureolum were found to be infected with Pomphorhynchus for up to five weeks after being fed infected amphipods.

The amphipod, Hyalella azteci, and the fish, Catostomus commersonnii, were selected to serve as intermediate and definitive host respectively in a detailed study of the developmental stages of Pomphorhynchus bulbocolli.

The eggs of Pomphorhynchus contain embryos called acanthors. These eggs when eaten by Hyalella soon pass into the intestine where the young acanthors become active and with the aid of their embryonic hooks escape from the enveloping shell membranes. A recently released acanthor is 0.055 mm. in length. Just caudal to its anterior end one sees in the rather delicate cuticle which makes up the wall of the embryo a shallow pocket bordered by two chitinous ridges and five pairs of hooks. Fifty-five to sixty small accessory spines are also seen on the anterior end. The internal morphology is made up of a syncytial mass of condensed nuclei and a surrounding syncytial area containing eighteen spherical giant nuclei. Within four to six hours the acanthors make their way through the intestinal wall into the hemocoel where development to the infective stage takes place.

At the end of fourteen days of development the larval worm which is now called an acanthella has reached a length of 0.44 mm. . The central embryonic mass now shows the anlagen of the proboscis, proboscis sheath, anterior ganglion, gonads, and other reproductive structures. By the sixteenth day the sexes can be differentiated.

On the nineteenth day of development the primordia of proboscis hooks can be seen within the still inverted proboscis. The male genital system is made up of two slightly overlapping testes, six cement glands, Saeftigen's pouch, penis, and a partially formed bursa. The female genital system is made up of four to six embryonic ovarian masses within a genital ligament, uterine bell, and beginnings of the uterus and vagina.

By the thirty-third day the male and female genital systems and the proboscis are fully formed. After thirty-five to thirty-seven days within the Hyalella the larval worm which has reached a length of 3.5 mm. is able to establish itself in the proper fish host.

Infective juvenile Pomphorhynchus fed to the fish, Catostomus commersonnii, attach themselves to the wall of the mid-intestine. Based on sperm production male worms reach sexual maturity in three weeks while it requires ten weeks for the female worms to produce viable eggs. By the end of ten weeks the females reach a length of 14.5 mm. while the males measure 10.6mm. .

A study was made on the development of infective juveniles of Pomphorhynchus bulbocolli in artificial media. In a medium containing 3 parts peptone broth, 1 part horse serum, 1 part yeast extract, and 1% glucose, juvenile worms not only survived for 72 days but grew from a length of 3.5 mm. to 10.0 mm. . Male worms reached sexual maturity in this medium.

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CHANGES IN THE DISTRIBUTION OF
PHOSPHORUS OF THE DEVELOPING
GRASSHOPPER (MELANOPLUS
DIFFERENTIALIS) EMBRYO

(Publication No. 4085)

Kiao-Hung Lu, Ph.D.
State University of Iowa, 1952

This study was an attempt, first, to analyze the various phosphorus fractions and transformations in the developing egg of the grasshopper, second, to determine the phosphorus pool from which the nucleic acids and other organic phosphates derive their phosphate for synthesis, and third, to test the idea of the constancy of desoxyribonucleic acid in each cell nucleus.

On the basis of their physico-chemical properties the phosphorus compounds were divided into the following four classes: acid soluble phosphorus (ASP), lipid phosphorus (LP), total nucleic acid phosphorus (TNP), and phosphoprotein phosphorus (PP). The separation of these different phosphorus fractions was carried out according to the method of Schmidt and Thannhauser and the phosphorus content of each fraction was determined by the colorimetric method of Fiske and Subbarow.

The following facts were found in this study:

1. LP in the egg declines rapidly in the prediapause period and remains at a fairly constant level in the diapause and postdiapause phases. ASP shows only a slight decrease in earlier development but undergoes a rapid fall in the later.

2. Both ribonucleic acid phosphorus and desoxyribonucleic acid phosphorus increase during development. The increase of DNAP parallels growth, while the increase of RNAP is slightly irregular.

3. DNAP is almost entirely confined within the nucleus while RNAP is chiefly located in the cytoplasm.

4. The rate of increase of ASP and LP in the embryo does not parallel the rate of decrease in the egg. The important enzymes responsible for splitting these phosphorus compounds were found in the extra-embryonic tissues. This indicates that some changes of LP and ASP must take place in the extra-embryonic tissues before they transfer to the embryo. It was also found that the cytoplasm has a high content of ASP and a low content of LP. This suggests that the phosphate, after entering the embryonic cells, is in an acid soluble form and as such then combines with purine and pyrimidine bases to synthesize the nucleic acids.

5. During diapause, the amount of LP in the nucleus is much lower than in the active developmental phases. It seems that LP may play a part in mitotic activity.

6. The number of nuclei of an embryo in different developmental stages has been counted by means of a hemocytometer and the DNAP content has been measured. Each nucleus has, on an average, 1.27×10^{-6} DNAP or 12.8×10^{-6} DNA.

Microfilm copy of complete manuscript of 56 pages, \$1.00. Enlargements 6" x 8", 10¢ per page.

GERM CELL CYCLE OF *SPIRORCHIS*

ARTERICOLA WARD, 1921

(TREMATODA: SPIRORCHIIDAE)

(Publication No. 4097)

Sister Mary Benita Pieper, Ph.D.
State University of Iowa, 1952

The life history of *Spirorchis artericola* Ward has been determined and its germ cell cycle traced through the larval stages in the intermediate host, *Helisoma trivolvis*. The normal final host in Swan Lake, Iowa, is *Chrysemys picta bellii*.

The theory of germinal lineage can be applied to *Spirorchis artericola*. In the larval stages, no indication of maturation phenomena or polar body formation and no suggestion of the formation of germinal cells from the body wall were found.

In both the miracidium-mother sporocyst and the daughter sporocyst, the cell which gives rise to the germinal line segregates at the first cleavage from the soma and multiplies by mitosis. Each germinal cell may divide to form two cells, the propagatory and the ectodermal cell. Segregation of the germ plasm in the propagatory cell continues until differentiation of the early embryo. At that time the propagatory cell divides into germinal cells. By simple polyembryony these grow, multiply, and differentiate in the miracidium-mother sporocyst to produce daughter sporocysts, and in the daughters to form cercariae. In the cercariae, however, the germinal descendants of the propagatory cell form the genital primordium, which differentiates into testes, ovary, and accessory glands in the adult.

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MORPHOGENESIS OF ESTROGEN INDUCED HYPERPLASIA OF THE ADRENALS IN LARVAL FROGS

(Publication No. 4104)

Sheldon Jerome Segal, Ph.D.
State University of Iowa, 1952

The adrenal development of control tadpoles and of *Rana sylvatica* larvae treated with 2 mg. estradiol per liter of aquarium water has been studied by the use of various histologic techniques. Step by step tracing of adrenal development in normal larvae shows that the cortical adrenal tissue arises from mesonephric blastema cells and the medullary cells of the adrenal take their origin from sympathoblasts which develop chromaffin characteristics.

Treatment with high dosages of estradiol causes precocious and hyperplastic development of both medullary and cortical adrenal tissue; the former is increased chiefly in the upper region of the gland, at the level of the sixth sympathetic ganglia, while cortical tissue becomes abundant throughout the length of the adrenal. In addition, the sixth sympathetic ganglia are never well-formed and become incorporated into the adrenal cord. In treated larvae the adrenal is a solid, unpaired mass which permanently maintains its primordial position between the descending aorta and the caval vein.

These observations are discussed as they relate to previous studies on adrenal origin and development.

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EARTH SCIENCES

GEOLOGY

THE ORIGIN OF EMERY DEPOSITS

(Publication No. 4180)

Gerald Manfred Friedman, Ph.D.
Columbia University, 1952

Emery deposits of the United States are confined to the Appalachian belt, and have been investigated in Alabama, North Carolina, Virginia, New York and Massachusetts. They are developed in gabbros, norites, amphibolites and probably peridotites and dunites. Deposits occurring in amphibolites may be locally adjoined by serpentine or steatite bodies. The persistent presence of granites or granite pegmatites close to emery deposits is conspicuous. Aplites, pegmatites or quartz veins commonly cut the basic rocks. A study of the literature and maps of foreign emery deposits agrees with the pattern observed in the United States.

Two types of emery were recognized, spinel-bearing and spinel-free.

Formation of the spinel emery is explained by the reaction between the emanations of consolidating granites or granite pegmatites and pyroxene-bearing basic rocks. This reaction resulted in the formation of hornblende or biotite and the release of iron, magnesium and aluminum ions. The released ions gave rise to the minerals making up the spinel-emery. Some aluminum ions, however, passed into the adjoining schists and reacted with quartz to form sillimanite, andalusite and kyanite, magnesium-iron ions in a similar reaction gave rise to cordierite and sapphirine, while ferric ions yielded magnetite. These minerals were noted in adjoining formations of the New York and Virginia deposits but were not observed elsewhere.

Spinel-free emery was probably formed by metasomatic alteration of basic or ultrabasic rocks by granites or granite pegmatites but the progressive changes that were responsible for its formation could not be traced.

The influence of the granites or granite pegmatites is indicated by their structural relations to the basic rocks and emery deposits, by the typical suite of minerals containing volatile constituents, and by the characteristic metasomatic changes in the basic rocks that are normally ascribed to the action of granites or granite pegmatites.

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THE GLACIAL GEOLOGY OF THE NAKNEK DISTRICT, THE BRISTOL BAY REGION, ALASKA

(Publication No. 4005)

Ernest Hathaway Muller, Ph.D.
University of Illinois, 1952

The Naknek district is an area of about 4000 square miles in the northern half of the Alaska Peninsula, southwestern Alaska. It consists chiefly of the portion of the Bristol Bay lowlands and adjacent western piedmont of the Aleutian Range drained by the Naknek River. It is composed principally of andesitic volcanics, granitic intrusives and coarse clastics of Mesozoic and Cenozoic age, and volcanics and unconsolidated sediments of Quaternary age. Present land forms are products of glaciation associated with stream erosion, eolian activity and volcanism, acting on major physiographic features as they existed at the close of the Pliocene.

Lake-filled glacial troughs transecting the piedmont of the Aleutian Range and glacial materials underlying the coastal lowlands indicated that trunk glaciers formerly extended from the Aleutian Range west across Kvichak Bay. Moraines considered to have been formed during four Quaternary glaciations, each in turn less extensive, are described. The earliest recognized glaciation is represented by a till ridge, considered to be an end moraine, which forms the drainage divide west of Halfmoon Bay, 23 miles west of Naknek Village. Till exposed on the divide and in adjacent shore bluffs contains boulders from the Naknek formation, which crops out in the Aleutian Range, 75 miles to the east. The relative antiquity of the Halfmoon Bay moraine¹ is shown by its subdued topography, its position with respect to moraines of later glaciations nearer the mountain front, and by partial induration of the till.

The second recognized glaciation is represented by a much modified moraine, the most conspicuous remnant of which is Johnston Hill, near the east shore of Kvichak Bay, 13 miles southwest of Naknek Village. All details of primary glacial topography are modified and exposed erratics are uncommon on both the Johnston Hill and Halfmoon Bay moraines. Although marshes and ponds are numerous, the drainage pattern is well integrated.

The third recognized glaciation is represented by a moraine of which Mak and Air Hills, 8 miles east of Naknek Village are remnants. Correlated with it are lateral moraines preserved in the foothills above the level of subsequent glaciation. Although later breached and partly buried by outwash, the Mak Hill moraine retains much of its primary glacial topography.

The latest major glaciation is represented by conspicuous moraines that enclose lake-filled glacial troughs transecting the piedmont. This moraine system is here referred to as the Brooks Lake

moraine because minor fluctuations of the glacier front are best recorded in the Brooks Lake basin. A brief readvance during general recession produced the moraine that encloses Iliuk Arm, a headward embayment of Naknek Lake. On the basis of relative physiographic position, topographic prominence and preservation, the Brooks Lake moraine is tentatively correlated with similar moraines on Kenai Peninsula and in the Alaska Range. Radiocarbon dating on Kenai Peninsula indicates that this glaciation occurred between 5000 and 14,000 years ago.

Moraines near present glaciers in the Aleutian Range represent fluctuations of recent centuries, the greatest extent of ice since the Brooks Lake glaciation.

The relative effectiveness of geomorphic processes shifted after deglaciation of the piedmont and lowlands. Rivers adapted their beds to new conditions of load, discharge and gradient. Eolian processes continued with decreasing vigor, depositing a blanket of loess and volcanic ash, and locally developing dune and blowout topography. Intensive frost action and formation of permafrost masked landscape details by development of characteristic microphysiographic features.

¹Moraine names are used merely as a means of reference and do not constitute formal nomenclature.

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STRATIGRAPHY AND MICROPALAEONTOLOGY OF THE SUNDANCE GROUP, EASTERN WYOMING

(Publication No. 4132)

James Algert Peterson, Ph.D.
University of Minnesota, 1952

The Swift-Rierdon nomenclature of the Ellis group in Montana is applied in eastern Wyoming to formational units of the Sundance group. Indications are that the names are applicable to the marine Upper Jurassic throughout most of Wyoming and western South Dakota, but the term "Sundance" should be retained because of historical significance.

Thickness maps indicate that the distribution of the Rierdon sediments in eastern Wyoming was influenced by a minor depositional basin, the "Powder River Embayment," corresponding roughly with the present-day Powder River Basin, and a positive-trending feature, the "Sheridan Arch," present across north central Wyoming during the early part of Upper Jurassic time. Micropaleontologic studies indicate the presence of two distinct Rierdon ostracode biofacies whose distribution is apparently governed by environmental factors associated with presence of the Sheridan Arch.

The Swift sediments are lithologically and paleontologically distinct from those of the Rierdon, but

show a less definite pattern of distribution, probably owing to ineffectiveness of the "Sheridan Arch" during the time of their deposition. For a similar reason, only a single ostracode assemblage is present in the Swift formation. Two ostracode zones are recognized within this assemblage.

One new genus and several new species of Ostracoda, dominated by members of the Cytheridae, are described from the Rierdon formation of Montana, Wyoming, and western South Dakota.

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PALEOECOLOGY OF THE DELAWARE MOUNTAIN GROUP, GUADALUPE MOUNTAIN AREA, TEXAS AND NEW MEXICO

(Publication No. 4236)

J. Keith Rigby, Ph.D.
Columbia University, 1952

The Delaware Mountain group is a series of interbedded limestone and sandstone tongues which form the Brushy Canyon, Cherry Canyon, and Bell Canyon formations. The rocks are of Guadalupian age and crop out around the western margin of the Delaware Basin in Trans-Pecos Texas and southeastern New Mexico. These rocks contain an unusually complete and impressive record of the evolution of a deep and stagnant basin.

The study is aimed at a reconstruction of environmental conditions under which these three formations were deposited in the Delaware Basin, and at their relationship with reefs which surround the basin margin. Details of stratigraphy showing interrelations of sandstone, limestone, and reef talus in space and time are shown by paleolithologic maps and stratigraphic diagrams.

The greatest interest attaches to thin tongues of limestone detritus which are interbedded with fine-grained quartz sandstones. They consist of detrital calcium carbonate derived mainly from the destruction of growing reefs. They contain many fossils of reef origin which have been swept into the basin and later replaced by silica. This transported record of reef life is in many ways the best and most complete available in the area. Consequently this almost unique record is used for paleoecological evaluation of the faunas, including especially the quantitative importance of the major systematic fossil groups.

It is concluded that the basin floor was uninhabited except for *Euomphalus* and related gastropods, the brachiopod *Leiorhynchus*, echinoids, and possibly the pelecypod, *Posidonia*. Siliceous sponges grew on the reef talus around the margin of the basin, while the upper more normal marine waters were inhabited by radiolarians, ammonoids, and fishes. The remainder of the fossils reported in the literature of the region were either reef, or lagoon dwelling forms.

The margin of the Delaware Basin, as exposed in the Guadalupe Mountains is one of the few areas in

the world where the depth of a Paleozoic sea can be approximately determined. This is possible because the rocks have been little deformed since their deposition. It is concluded that the basin was very shallow, perhaps only a few tens of feet deep, during early Guadalupian time when small patch reefs were formed near the basin margin. These reefs coalesced to form the Goat Seep and Capitan reef masses as the basin deepened to a maximum of about 2000 feet during late Guadalupian time.

The Delaware Basin area probably is not excelled anywhere in the abundance and variety of primary sedimentary features related to depositional slope. Subaqueous slides, slump masses, and evidence of turbidity and density currents are common and well exposed. Features that result from interstratal flow such as interstratal flow folds, wavy-bedding, and injection lenses occur throughout the stratigraphic column. Channels, ripple marks, and other current-formed features are ascribed to the action of deep bottom currents.

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THERMAL TRANSFORMATIONS IN SOME LAYER SILICATE MINERALS

(Publication No. 4018)

Edwin Wilson Tooker, Ph.D.
University of Illinois, 1952

Precise data on the thermal behavior of minerals is desirable for mineralogical considerations of phase rule relations and temperature of mineral formation. The layer silicates muscovite, biotite, chlorite, and illite, important rock-forming minerals, were selected for this investigation. The basal cleavage of these minerals permits the observation of structural modifications along the c-axis when the minerals are subjected to a progressive, stepwise heat treatment. The basic assumption of the conventional air quench procedure (that phase modifications remain after quenching long enough to be detected) was tested.

Single crystals of the micas and chlorite and sedimental flakes of illite were heated and examined by two methods: (1) by the conventional muffle furnace - air quench process with subsequent X-ray examination, and (2) by a high temperature furnace mounted on an X-ray spectrometer. The two sets of X-ray data indicate a marked variation in the high temperature region. Temperature necessary for complete transformation varies as much as 100°C for given species depending on variations in experimental procedures, particle size, and perhaps other factors.

The X-ray diffraction data were used to calculate a visual image of the structure (electron density) by means of Fourier syntheses. The electron density curves supplemented diffraction data in the interpretation of results.

The high temperature procedure has the disadvantage of not accounting fully for thermal expansion of the sample. The procedure has the following advantages: (1) permits close control of experimental temperature, (2) eliminates rehydration effects, (3) allows detection of unstable phases in the critical temperature range before decomposition, (4) gives a qualitative evaluation of particle size, (5) indicates the importance of the time factor in transformations, and (6) is a more rapid and accurate X-ray method.

Dehydration proceeds at a slower rate than previously reported and is complete with the formation of a modified phase or with decomposition. Dioctahedral mica (muscovite) loses more hydroxyl water and has greater lattice expansion than does the trioctahedral biotite mica. Illite resembles muscovite but is modified at a lower temperature. Dehydration begins in the octahedral portion of the structure; the tetrahedral layer is not modified for an additional 200-300°C. Chlorite consists of alternate trioctahedral mica and brucite layers; the brucite layer is modified at a lower temperature than the mica layer, which dehydrates as biotite does, but at a lower temperature.

The specific character of the mica structure determines the amount of dehydration and consequently the presence or absence of a modified structure before decomposition. Dioctahedral micas have a modified (anhydride) structure, whereas the trioctahedral varieties do not. The modified chlorite structure results from a rearrangement within the brucite layer which is not restricted by coordination with a tetrahedral silica layer.

Diffraction of new phases, previously reported to occur after decomposition, begin to appear before decomposition. The close relationship between the basic mica structure, the amount of dehydration, the gradation (or lack of it) to an anhydride, and the early appearance of new phases lends support to the concept of structural inheritance in the development of initial high temperature phases.

Precise evaluation of thermal transformations requires careful consideration of the time factor with respect to particle size and degree of crystallinity, approach to equilibrium, and decomposition temperature. Decomposition of single crystals can be described as a "point" at which thermal energy disrupts the structure. A range in particle size produces a range of temperatures necessary for decomposition.

The method of investigation was designed for further study of the clay mineral group, but can be modified for other silicate minerals. Data from well crystallized layer silicates have proved valuable in the interpretation of data from illite, a less well crystallized, analogous, clay mineral.

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**FIRE CLAY DEPOSITS OF EASTERN
FREMONT, WESTERN PUEBLO AND
ADJACENT COUNTIES, COLORADO**

(Publication No. 4266)

Karl M. Waage, Ph.D.
Princeton University, 1946

Abstract not available.

Microfilm copy of complete manuscript of 236
pages, \$2.95. Enlargements 6" x 8", 10¢ per page.

MINERALOGY

**MINERALOGICAL STUDY
OF CERTAIN COLORADO AND ONTARIO
URANINITE DEPOSITS**

(Publication No. 4252)

Harold Douglas Wright, Ph.D.
Columbia University, 1952

At Caribou, Colorado, a vein of uraninite-bearing sulfide ore in monzonite is enveloped by an alteration halo up to four feet thick. Alteration began with development of chlorite, calcite, epidote, and pyrite in pyroxene and biotite followed by an argillic phase of montmorillonite and kaolinite formation chiefly in plagioclase and orthoclase, and finally a sericitic and silicic phase strongly developed adjacent to the vein. The zonal arrangement is complicated by a

sericitized zone lying outside the argillized zone. The alteration was reflected chemically by strong leaching of lime and soda, increases in potash and silica adjacent to the vein, and little change in magnesia and alumina.

Deposition of vein minerals took place in two stages, with uraninite having been formed early in the second stage, followed by sulfides and silver minerals. Uranium leakage from the vein extended to the outer limit of altered wall rock, beyond lead and zinc dissemination. The metals appear to have been transported by ionic diffusion through porous wall rock, and penetration was controlled by availability of porous rock rather than abundance of fractures.

In the Theano Point area, Ontario, simple uraninite-hematite-calcite veinlets occur in Pre-Cambrian diabase dikes and granite. Wall rock alteration is characterized chiefly by hematite, with serpentine, sericite, and kaolinite of uncertain origin. Hematite is genetically related to calcite deposition, and, both minerals precede and follow uraninite in the vein sequence.

Uraninite at Caribou and Theano Point has characteristic colloform texture, and a colloidal origin appears highly probable. Sulfides at Caribou showing similar form are believed not to have had a colloidal origin. Lattice constants for uraninite from both localities are relatively low, 5.38 to 5.40.

Comparison of features of the two very different types of uraninite occurrences studied with others described in the literature brings out certain relationships common to many primary uranium veins.

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pages, \$1.18. Enlargements 6" x 8", 10¢ per page.

HUMANITIES

ART AND ARCHAEOLOGY

**ROMAN PORTRAITS FROM THE
ATHENIAN AGORA**

(Publication No. 4191)

Evelyn Byrd Harrison, Ph.D.
Columbia University, 1952

The fifty-one Roman portraits and fragments of portraits published here were discovered in the course of the first twenty years of the American Excavations in the Athenian Agora (1931-1951). The main body of the work consists of a descriptive catalogue of the portraits in which I attempt to date each piece and to show the place that it occupies in the history of the development of Roman portraiture in Greece. These fifty-one portraits constitute only a small fraction of the total mass of Roman portraits

made in Athens that are preserved today, but they form a representative series extending in time from the first century B.C. to the fourth century after Christ and they offer a cross-section of the types, styles, techniques and subjects of Athenian portraits in marble during these five centuries.

The concluding section of the dissertation contains certain general observations on the style and chronology of Roman portraits made in Athens that have been suggested to me by the study of the Agora portraits. Roman portraits made in Greece have a special interest for the question of the relation of Roman art to the art of Greece. The Romans were not a marble-working people, and it was from the Greeks that they first learned the techniques of carving sculpture in marble. It was inevitable that some of the late Hellenistic sculptural tradition should go into the make-up of the first Roman portraits. Additional Hellenic influence, in

the form of conscious classicism, seems to have recurred periodically throughout the history of Roman portraiture. Also, it is known that many of the sculptors who carved Roman portraits were of Hellenic blood. In view of these facts, it is of interest to examine the Roman portraits made in Athens itself. Did the workshops of Athens, the homeland of this Hellenic tradition and of many of the Greek sculptors who worked in Rome, continue to lead in the development of sculptural style or did they become provincial followers of developments in the capital? The evidence of the Agora portraits, in those few cases where a chronological check is possible, points to the latter conclusion. Athenian portraiture seems to lag slightly behind that of Rome not only in the periods of so-called Roman realism but even in the periods of classicistic reaction. This holds true for the Republican period and for the first two centuries of the Empire.

In the third century after Christ there begins in Roman art the transition to that art which is often called Late Classical and which finds its first full expression in the time of Constantine. In this the traditional Hellenic plastic values which had been to some extent absorbed by Roman art are entirely superseded. In the case of Greek sculptors, however, scholars have tended to assume a retention of the traditional plastic values even in the time of Constantine. Key evidence for this assumption was a head of a young man found in the "Valerian Wall" in 1861. The "Valerian Wall," however, has now been shown by the Agora excavations to have been constructed around A.D. 280. Thus the head in question cannot be later than 280, and the same is true for all the portraits of kosmetai found with it. The final chapter of the dissertation consists largely of a reevaluation of the trends in Athenian portrait style of the third century based on the above evidence. The portraits of kosmetai and the Agora portraits form the principal material, but the conclusions reached suggest also the inclusion in the third century of a group of "philosopher" portraits assembled by Rodenwaldt and commonly dated in the fourth century.

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AN INTERPRETATION OF THE
PERSEUS-GORGON MYTH IN GREEK
LITERATURE AND MONUMENTS THROUGH
THE CLASSICAL PERIOD

(Publication No. 4197)

Thalia Phillis Howe, Ph.D.
Columbia University, 1952

This dissertation is a study of the Perseus-Gorgo myth as it appears in Greek literature and monuments through the classical period. The material is surveyed along strictly chronological lines and all conclusions are based on tangible evidence. The

aim has been to demonstrate how a single imaginative idea, the Gorgon and her decapitation, was evoked under conditions of psychological, social and economic tension, and then evolved into a number of aetiological, but constantly poeticizing myths, which spread in the Greek world with varying importance and in various periods.

First the ancient and modern interpretations of the myth are considered, most of which prove to be rationalizations based on late evidence. Then the problem is attacked by an investigation into the etymological origins of Gorgo and Perseus. These investigations prove that the gorgoneion superseded the full-bodied Gorgon and was originally a primitive mask-type of mixed animalistic characteristics symbolizing man's fear of beasts of prey. The role of Perseus, whose name means "the Cutter," originated in the attempt by the ancients to explain the gorgoneion, the bodiless head. A section is devoted to the question of Perseus' and Gorgo's possible origins in Eastern mythology, particularly the Gilgamesh-Humbaba myth of Mesopotamia. Also the Gorgon's role as Poseidon's consort is considered, as is her involvement with Artemis.

After the traditional features of the gorgoneion and the form of the Gorgo had been established, Corinth made further stylistic developments directed toward the humanization of the monster, as Payne has shown in his *Necrocorinthia*. In contrast, the Eastern examples succeeded in being only diverse and bizarre and appeared merely on trivia, while the Chalkidian examples were monotonous and betrayed local indifference to the theme.

The Athenians, however, as numerous illustrations on all kinds of monuments show, adopted the Corinthian direction toward the humanization of this apotropaism, favoring the scene of Perseus' flight with the Medusa head. Athena's inclusion in these scenes indicates that the hero conquered more by Olympian beneficence than by magic. The goddess's assumption of the gorgoneion on her shield and aegis, as the evidence shows, did not take place before the last third of the 6th century.

During the 5th century Attic painters rendered Perseus as the hero of Polygnotan Ethos, no longer as the magical adventurer of the 7th and 6th centuries. At that time also Aeschylus wrote a tetralogy on the myth, three titles of which are known. The fourth probably dealt with the expulsion of Perseus and Danae by Akrisios, as can be inferred from contemporary vase paintings. It is possible that in dealing with this myth Aeschylus celebrated the extirpation of this monster by Olympian powers, just as later, in the *Eumenides*, he represented the triumph of Olympian Order over the Furies.

It is indicated that Sophokles was less concerned with the trials of Perseus than the Hybris of Akrisios, a favorite theme of that dramatist. The Oedipus myth also offered inescapable parallels, particularly in the death of Akrisios at the hands of his grandchild.

In contrast, Euripides seems to have favored Danae as his protagonist since she offered a perfect subject for another of his dramas on the restricted fate of women in that age. *Andromeda*, however, was

Euripides' great popular triumph, particularly among the 4th century cities of South Italy, as the monuments testify.

Thus this myth, arising in popular belief, reached its greatest expression in the plays of the 5th century dramatists. What the later Greeks and Romans did with the theme is material enough for another study.

Microfilm copy of complete manuscript of 320 pages, \$4.50. Enlargements 6" x 8", 10¢ per page.

DRAMA

A STUDY OF DRAMATIC COMEDY

(Publication No. 4214)

Cecil Michael McCulley, Ph.D.
Columbia University, 1952

The purpose of this study is to investigate in rational order the dramatic appeal of comedy in its various forms, with definition of the general concepts involved and intensive analysis of representative examples. As sources for analysis I have drawn upon many great English plays from Shakespeare through Shaw; Aristophanes and Molière, as well as other significant French works; and several modern American dramas. I have taken into account numerous authorities on the theory of comedy from Plato to the present day, made reference to the principles and findings of aesthetics, psychology, and sociology, and checked my conclusions against those of pertinent critical works. The primary emphasis is upon the relevance of the conclusions to literary and dramatic criticism. These conclusions are original; my conception of comedy is directly indebted to previous views, but it represents a synthesis rather than a simple borrowing.

Appeal in drama evokes immediate approval and may transmit lasting value; it attains aesthetic quality when it becomes so intense as to induce attention to the response as an end in itself. The most satisfactory definition of comic appeal is a compound of the theories of Kant and Mr. Ralph Piddington: comedy arises from a concrete situation, sufficiently strong in conviction and reference to produce a keen, quasi-emotional expectancy; but the outcome of this situation is a firm incongruity, expressed in terms of social evaluations. This provokes both amusement, the affirmation of fundamental social solidarity before the challenge of contradiction, and relief from the previous tension. The quality of comedy depends upon the extent of the concrete situation, the amount of feeling available to relief, and the strength and complexity of incongruity involved. The appeal may stress relief or incongruity, but is most effective when it combines both. This conception may be defended against those which make degradation, a hint to superiority,

liberation, or play the principal basis of laughter, and against the brilliant theories of Bergson and Freud. It is partially sustained by numerous other authorities.

In order to clarify the relationship between the other dramatic appeals and the comic, I have distinguished and defined these. Emotional appeal requires an equally concrete situation, but its references direct acceptance instead of provoking reaction. More abstract situations, shaped in terms of social attitudes, are used in sentimental effect, which affirms ritualistically a warmly approved conception, and satire, which exposes an object of scorn. Ideational and informational appeals stimulate learning of ideas and facts patterned in a situation. Realistic impressions induce the pleasure of recognizing details or types; exotic or novel impressions are variations from the familiar causing pleasant surprise, shock, and wonder. Developmental appeal utilizes timing and progression in the form of the dramatic presentation to evoke suspense and pleasant concentration on the movement.

The variety of dramatic comedy requires specific interpretation and careful analysis of types and examples, from the simplest verbal joke up to the complete play. Familiar categories are more exactly defined in the light of this study, and new ones discovered. Comic speech emphasizes incongruity; comedy of character, relief; and that of incident or scene blends both aspects. Larger situations, comprehending all three dramatic elements, may be judged in terms of concreteness of texture and fullness of representation; the former contributes especially to incongruity, the latter to expectation. The greater qualities of the complete drama are the autonomous will of the characters and the formal development of the action. The empathy and further definition thus afforded expand and perfect upon the comic as well as other appeals; in these terms the types of whole comedies may be distinguished, analyzed, and understood.

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EAST EUROPEAN LITERATURE AND LINGUISTICS, SLAVIC

THE MODERN POLISH SHORT STORY

(Publication No. 4248)

Olga Scherer Virski, Ph.D.
Columbia University, 1952

The analysis of the Polish short story must be preceded by an investigation of the literary properties and functions of the genre in general. The principles of this investigation are based on the establishment of the internal structural laws which govern the short story and distinguish it from other forms of fiction,

particularly the novel. With the aid of conclusions reached by various theoreticians of the short story, particularly the German ones of the nineteenth century and the Russian formalists, and by the author of this study, as well as with that of numerous examples drawn from well-known European and American short stories we establish the unique function played in it by its brevity and compact scope, its plot (with particular emphasis on climax and denouement), its characteristic distribution of the elements of time and space, its use of narration, description, and dialogue, the nature of its characters, and the importance in it of a unified atmosphere and setting. Short stories may be divided into three categories: descriptive short stories, short stories of character (including the character sketch and the so-called dramatic story of character), and short stories of action.

On the basis of this theoretical analysis we proceed to discuss chronologically products of short-story writing as manifested in Poland since the era of Romanticism. During Romanticism the Polish short story was practiced almost exclusively by poets, then in exile in Paris. Without being then a fully developed, autonomous fictional genre, the Polish short story presented some fine examples, particularly among the works of the poet, Cyprian Norwid.

During the period of pre-realism Poland contributed a specifically Polish form of the casual oral tale – the *gaweda* – practiced by such writers as Rzewuski and Chodzko. The more classical short story, influenced by Western writers, was practiced by Kraszewski and Korzeniowski.

In the latter part of the nineteenth century Poland entered a period of literary realism during which the short story reached a high level of autonomy and originality which such novelists as Prus, Orzeszkowa, Sienkiewicz, or the poetess, Konopnicka. The short story of character was these writers' favorite form. Their sincere concern about the fate of the peasants and the city proletariat and their strong will to change it are outspoken in their productions.

In the epoch of modernism – which in Poland was known as "The Young Poland" – short-story writers turned to experimentation with more varied elements, deepening those already perfected in the nineteenth century and lending emphasis to the elements of setting and atmosphere. The two outstanding novelists and short-story writers of "The Young Poland" were Zeromski and Reymont.

After the first World War the Polish short story made further progress in the field of experimentation with gradually more complex plot, play of characters, and role of setting. At the same time the number of novelists also engaged in writing short stories increased, including many outstanding women (Goetel, Choromanski, Dabrowska, Nalkowska).

The modern Polish short story, in its development from the beginning of the nineteenth century until the present, may be said to have followed the laws of the genre, as observed in world literature, and some of the patterns established in the West,

but it has contributed a great deal of originality, particularly in the treatment of characters and specifically Polish situations. It is, however, not the most representative genre in Polish literature which reached its highest artistic expression in the field of poetry. The short story was practiced chiefly by the famous Polish novelists. It is becoming gradually more widely practiced, and its popularity increases both at home and in exile.

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ENGLISH LITERATURE AND LINGUISTICS

THE LITERARY ASPECTS OF FABIAN SOCIALISM

(Publication No. 4170)

William Ross Clark, Ph.D.
Columbia University, 1952

This book contends that the Fabians played a literary as well as a political role in modern British history, and that the leading expositors of Fabianism, especially Shaw and Webb, inherited and carried on the literary functions of such Victorian predecessors, for example, as: Carlyle, Ruskin, Arnold, and Mill. It is granted that sometimes these functions were more didactic than artistic (this is true of both sets of writers, and especially of Mill and Webb) but it is argued that in Victorian England and in the work of some important and gifted writers of the early twentieth century there is so much pre-occupation with social and economic problems that politics, economics, sociology, and literature overlap – even become, some of the time, one thing.

It is Shaw's indisputable genius that accounts mainly for the overlapping of Fabian Socialism and literature, and this book argues that Socialism is discernibly implicit even in what are commonly thought of as his most purely "literary" works. It is further contended that some of the solid, lucid, and polished essays of Sidney Webb belong in the canon of literature as do the instructive essays of Carlyle and Arnold. Apart from their literary excellence, Fabian publications in general deserve study because of their extraordinary influence. H. G. Wells is also considered in this book, because, though he quarrelled with the Fabians and their methods, he was a product of the same elements in the time-spirit which produced the Fabians, and his goal and general intellectual influence were not dissimilar to theirs.

The book traces the intellectual and other origins of Fabianism, discusses and evaluates *Fabian Essays*, "the most important single publication in the history of British Socialism." It deals similarly with the *Fabian Tracts*. Shaw's work is examined for its

pervasive Socialist tendency, as are the principal political and economic novels and essays of H. G. Wells. The important works of the outstanding literary opponent of the Fabians and of Socialism generally, William Hurrell Mallock, are reviewed.

Finally the book discusses the literary style of Shaw, and of Wells. It describes a fundamental shift in tone, emphasis, and doctrine, in the didactic literature of the last two decades of the nineteenth and the first two of the twentieth century — that is, from such literature before 1880. It also shows how Shaw and Wells, in addition to using the conventional essay of the Victorians, adopted new literary media — the drama, the preface to the drama, and the novel — in carrying out their roles as critics of society and instructors of mankind.

Microfilm copy of complete manuscript of 316 pages, \$3.95. Enlargements 6" x 8", 10¢ per page.

THE IMPACT OF MADAME BOVARY ON THE ENGLISH NOVEL, (1857-1915)

(Publication No. 4169)

Edwin Harry Conn, Ph.D.
Columbia University, 1952

Madame Bovary, by Gustave Flaubert, published in 1857, has had profound influence on modern fiction. This study describes the impact of its example on the form and content of the English novel to 1915. Reinforcing the tendency, already present in English fiction, to write about everyday life, Flaubert's first novel, after its early notoriety, was accepted as a masterpiece of the novelist's craft. The subject of sexual and emotional frustration in middle-class marriage became somewhat more respectable in England as a result of the success of Madame Bovary.

A preliminary discussion of the place of Madame Bovary in French fiction is followed by an analysis of Flaubert's aim which shows him in reaction against the vulgarity of modern life and against his own romantic idealism. The author's sense of alienation from society is then set against the background which produced it.

The growth of a body of literary opinion in England occupies the first part of the study proper. Henry James takes his place as an unrivalled interpreter of continental literature; his three essays on Flaubert are treated at length. The part played by the Aesthetic Movement from Pater to Sturge Moore follows, and the section concludes with an examination of the criticism of Emile Zola and Paul Bourget in so far as their opposing views gave rise, respectively, to naturalist and psychological schools of Flaubert criticism in England by 1900.

Which English novelists felt the influence of Madame Bovary? George Eliot's Middlemarch and Hardy's The Return of the Native show some striking parallels, but a more significant case is that of Henry James, who paid careful attention to Flaubert's method. The American, The Bostonians,

Washington Square, and The Princess Casamassima may be Flaubertian, but due attention must be paid to Balzac, Turgenev, Daudet, and others. George Moore's outright imitation of Flaubert is explained next, and the naturalistic technique and subject-matter of Arnold Bennett and Somerset Maugham are described. Some novels of Conrad, Ford Madox Ford and Joyce are examined in the light of their admiration for Madame Bovary. The section concludes with a tentative synthesis of Flaubertian influence on an "Impressionist" school.

Two concluding chapters attempt to explain the decline of interest in the tightly-controlled, intensely realized analytic novel of which Madame Bovary is the prototype. The Russian novel, the novel of apprenticeship, the D. H. Lawrence novel, and the novel of revealed religion come to the fore. The result of these trends is seen in a summary view of French and English opinion of Madame Bovary to 1950, when the perfection of form and style of Flaubert's novel was being defended by Allen Tate and Elizabeth Bowen and attacked as insufficient by F. R. Leavis and Martin Turnell. Meanwhile Gide and Dumesnil had long since turned the attention of French readers to Flaubert's early works and correspondence, so that Madame Bovary seems, in 1952, to be more at home in England than in France.

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WILLIAM FALCONER: SEAMAN POET; A STUDY OF THE SHIPWRECK

(Publication No. 3966)

Gordon W. Couchman, Ph.D.
University of Pennsylvania, 1952

William Falconer (1732-1769) has been called the leading sea-poet of the eighteenth century. The study which follows is not an attempt to prove or disprove this contention. It is rather designed to show how Falconer's Shipwreck (1762-69), beginning as an individual expression of a seaman's experience, emerges finally as an appeal to the popular taste for sentimentalism in literature. It is intended to show further how certain features of Falconer's poem which have been regarded as Romantic are actually examples of Neo-Classical imitation.

In its original form (the first edition of 1762) The Shipwreck was acclaimed as a didactic poem which could serve as a manual for the instruction of sailors. The didactic element referred to consisted of extended passages of nautical lore carefully annotated. Although Falconer was the first to versify nautical matters in such detail, the basic motivation here was identical with the impulse that prompted the composition of John Philips' The Cyder (1708) or Dyer's Fleece (1757), and thus cannot in itself be regarded as Romantic, if by Romantic we mean in part something new and different. Moreover, even the nautical verses of Falconer's first edition

are heavily weighted with conventional Neo-Classical diction.

This conventionality persists in the two later editions (Falconer's own revisions) of 1764 and 1769. Poetic diction, periphrasis, epic imitation, abound. Into these two later editions, however, Falconer interjected a new element. This new element consists of descriptions of the ship's officers, a love story, and an increased use of the language of feeling, all clearly aimed at a wider audience than the "gentlemen of the sea" for whom, by Falconer's own testimony, *The Shipwreck* was originally intended. This new audience was the steadily increasing group of readers with a craving for the literature of sensibility and sentimentalism. Hand in hand with this new tendency in Falconer's poem goes an increased emphasis on moral didacticism to supplement the technical instruction of his nautical verses.

Falconer steadfastly resists the temptation to use the shipwreck theme for purposes of philosophizing, symbol, or allegory. In his three editions storm descriptions are limited to the subject of the sea itself. This limitation, again, has led critics to call Falconer's descriptions of nature Romantic. But though Falconer confines his sentimentalizing and moralizing to the interpolated passages in his two revisions, his descriptions of the sea are heavily conventional.

The irony of Falconer's own death at sea inevitably accounted for much of the appeal of his poem during the late eighteenth and early nineteenth century. Writers as far apart as Herman Melville and Robert Burns have given expression to this irony. Burns' friend, Mrs. Dunlop, was quick to detect a parallel in feeling between the "Occasional Elegy" which Falconer tacked on to the 1764 and 1769 editions of his poem, and Charlotte Smith's "Elegy" in her *Elegiac Sonnets* (1795). Coleridge's verses on *The Shipwreck in Sibylline Leaves* stress a dominant element in the trend toward sensibility in the two later editions: the friendship theme. Falconer's poem afforded Byron ammunition in the Byron-Bowles Pope controversy, and a quotation from *The Shipwreck* turns up in Masfield's *Dauber*. Falconer's reputation among biographers and historians of literature involves the question whether Falconer's poem is in part an example of Romanticism.

It is true that, to a point, at least, Falconer's *Shipwreck* represents at once and in a single poem both Neo-Classical and Romantic elements. Falconer's claim to individuality in a Romantic sense lies in his use of his own experience at sea and in his own special use of some of the conventional diction of his time. To underestimate this claim would be unfair, but to overestimate it is uncritical.

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THE CAUGHT IMAGE: A STUDY OF FIGURATIVE LANGUAGE IN THE FICTION OF HENRY JAMES

(Publication No. 4182)

Robert Lee Gale, Ph.D.
Columbia University, 1952

An image is defined as including simile, metaphor, extended personification, and imaginative analogy, and as excluding dead metaphor, idiom (English or foreign), proverb, and simple hyperbole.

In the one hundred and thirty-four novels and short stories of Henry James, there are nearly seventeen thousand images. They are often used merely to brighten the text; more significantly they reveal character and move the plot. They may be light, poetic embellishments; they may show knowledge dawning upon characters; they may reveal latent horror in life; they may be colorful and bizarre.

Most of the interesting, provocative figures fall into one or more of six major categories — water, flower, animal, religion, war, and art — or into one of many miscellaneous groups, including children, sports and games, sensations, unconscious sexuality, fire, metal, cup, jewelry, court life, and astronomical bodies.

James makes images from his casual observation of water, whether it is in movement, or occasioning pleasure, or meting out disaster. He reveals his experience as a traveller by water, and he shows acquaintance with classical literature by numerous allusions in water figures (and elsewhere).

He displays a keen delight in flowers, through varied images dealing with blossoms, fragrance, and gardens of blooms and fruits. Figures of this sort are more often used to describe women than men, joy than pain.

James compares men and (more often) women to animals of various kinds: horses, sheep, dogs, cats, and lions, among many others. Women are also often imaged as bird-like. As with the animal usages, the bird references frequently concern violence and misery. Relatively few figures concern fish, insects, and snakes.

The images concerning religion may be divided into three groups: those having to do with pagan religion, those coming from the Bible, and those concerning Catholicism.

The war figures help to make more insistent an undertone of violence always found in James. Classical, medieval, and modern weapons and battles are used in the imagery.

Art imagery, the largest category, draws upon literature — fiction, poetry, and the drama — upon painting, and upon sculpture. Music, architecture, and dance figures are usually rather unimportant.

James's figures often incidentally reveal personality traits in himself. For example, James hints at a liking for travel, Paris, wine, fire, the circus, metals, jewelry, children, and material wealth. He dislikes sports, mathematics, dentists, and the world of plain commerce. He indicates little imaginative response to the study or practice of medicine and of law. He responds delightedly to the human eye and the human voice.

Several Appendices chart James's imagery with respect to time of writing, length of fictional piece, and setting. The average is four images per one thousand words. The deviation from this norm is rather slight. From 1890 to 1915 the density is relatively higher than before. In short short stories and in long novels James used relatively more images. His revisions contain slightly more images. The stories set in England contain slightly more images. James's imagistic interest in man-made phenomena (religion, art, and war) dropped slightly through the decades. His interest in natural objects (water, flowers, and animals) dropped somewhat less. Water figures remain rather level in numbers. Religion figures decline steadily. War imagery is dense following the Civil War and does not fall (as do all the other categories) in the 1910's.

Imagery is but one aspect of style. It is of great significance in the work of poets. Among fiction writers, James uses images abundantly and greatly rewards students of figurative language.

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WISE MEN IN MOTLEY: THE FOOL IN ELIZABETHAN DRAMA

(Publication No. 4186)

Robert Hillis Goldsmith, Ph.D.
Columbia University, 1952

The wise fool of the Elizabethan drama is a traditional figure. His costume - the ass's ears, coxcomb, and occasional fox's tail - suggests the ancient animal masquerade. His characteristic behavior, as entertainer, licensed critic, and ironical observer of folly, derives from various sources, ancient and medieval. He exhibits the gayety of the jongleur, the candor of the ancient poets and philosophers, and the ironical perception of a Socrates. He combines the shrewd, proverbial wit of a Marcolf with the more than earthly wisdom of the Erasmusian fool.

Motley first appears on the stage in the French *sotties*, which were primarily vehicles for political satire. In England, the stage fool for a time merges his identity with the comic vice of the moralities. This jesting vice, sometimes dressed in motley, comments ironically upon the folly of the other characters. Like the later fool, he indulges in quibbling, in parody, and in singing old songs. But unlike the fool, who is usually a bystander, the vice frequently acts as the wit-intriguer of the plot. Because of their greater detachment, Shakespeare's fools function as comic choruses or embodiments of the comic spirit.

Robert Armin, who played Shakespeare's fools, distinguishes between natural fools, or ninnies, and fools artificial, who disguise their wits under cap-and-bells. To this latter class belong Rowley's Will Summers, Marston's Passarello and Dondolo, and

Middleton's Pickadill. Summers, although a bit sectarian, typifies the fool as truth-teller. The other non-Shakespearean fools are sometimes satirical, but their wits are too brittle and heartless to deserve the name 'wise.'

Wilkins' Robin and Babulo of *Patient Grissill* are technically not fools at all, but actually belong in the tradition. With their commonsense joined to compassion, they are akin to Shakespeare's truly wise fools.

Shakespeare's fools - even the Fool in *Lear* - have all of their five wits. These fools, unlike non-Shakespearean Passarello and Pickadill, are both witty and wise. Each of the four, Touchstone, Lavache, Feste, and *Lear's Fool*, is clearly differentiated from the others. Touchstone is the comic realist in the forest of romance, Feste is the exponent of the golden mean in loving and laughing, and *Lear's Fool* embodies the Christian doctrine of wise folly when he abandons his prudence to lovingly follow his King.

The fool as a satirical spokesman ought to be distinguished from the malcontent satirist and the railing buffoon. Certain non-Shakespearean fools sometimes rail bitterly and scurrilously at the abuses of the clergy and the depravity of women, but the Shakespearean wise fool differs from the malcontent Jaques, on the one hand, and the buffoonish Thersites, on the other. He parodies or comments ironically upon the petty foibles and pretensions of others; gently satirizing social and literary affectation. Touchstone, travestying the pastoral lovers and bantering the wise-seeming Jaques, typifies the fool as satirist.

After examining the fool closely, we must be careful not to exaggerate the importance of his role. Rowley gives Will Summers a disproportionately large part in his play, thereby distorting our focus and disturbing our sense of decorum. Does Shakespeare likewise violate decorum when he introduces the Fool into *Lear*? Eighteenth century producers objected that the presence of the Fool in tragedy was unseemly. But although Shakespeare alters, he does not upset our sense of dramatic propriety. The Fool intensifies the pathos and humanizes the play for us.

In a like manner, Feste tempers the comedy of *Twelfth Night*, rendering it gayer and more thoughtful. As Aristotle's mean, the witty man, he stands between buffoonish Sir Toby and boorish Malvolio. Both fools, the comic and the tragic, combine detachment with sympathy; mingling irony and pity.

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MELVILLE AND THE QUEST FOR GOD

(Publication No. 4064)

Frank Clark Griffith, Ph.D.
State University of Iowa, 1952

This essay falls into two parts, very unequal so far as pagination is concerned but of roughly equivalent importance. In the introductory chapter I attempt to account for a continuing religious crisis which I believe overtook Melville shortly after his return from the South Pacific (1844) and persisted during the remainder of his life. In the succeeding chapters the attempt is made to trace out the influence of this crisis upon Melville's work and especially upon *Mardi*, *Moby Dick*, *Pierre*, *Clarel*, and *Billy Budd*, books which tend to form a thematic and symbolic unity.

The introductory chapter stresses the Unitarian-Calvinist split in Melville's religious background, his reading of skeptics like Montaigne and Bayle, the influence upon him of cultural relativism, his preoccupation with the problems of evil and of religious knowledge. In essence, the conclusions of that chapter are these. Because his was a mind unusually responsive to tragedy, Melville was acutely sensitive to any form of evil. Evil as a fact, together with the theory of evil he found in Bayle's *Dictionary*, placed a ruinous strain on his religious faith. Increasingly, he came to believe God was responsible for evil, was a malignant demon rather than a just Deity.

Yet Melville could not face up to this assumption with equanimity. Basically, he was instinctively religious. Perpetually, he cherished the hope that if the ambiguous nature of God could be fully understood, the existence of evil might be justified and a sense of the eternal fitness of things restored. In Bayle and Montaigne, however, Melville encountered an extreme form of skepticism known as Pyrrhonism. According to this view, which Melville took to heart, man is deluded by his senses and reason, has no facility for knowing anything absolutely, is in particular cut off from all certain knowledge of God.

Hence Melville was involved in an intellectual paradox. Appearances told him God was evil. His instinctively religious mind rebelled against this allegation. But when he sought for knowledge of what God is really like, he ran afoul of Pyrrhonist doctrine and the limitations it placed on what man can know. This paradox is, I believe, the key to his creative work.

In the first four of the five books which I examine intensively, the following pattern is to be found. The protagonist becomes aware of temporal evil and suspects that God is implicated in its existence. But the protagonist also believes that if the world of appearances, all of them testifying to God's malevolence, could be transcended, then the suspicion of God's brutality might be allayed. In the ensuing quest for God, Melville introduces Pyrrhonist doctrine, designed to show symbolically that no quest for an Absolute can succeed. Nevertheless, the quest continues. To give it up is to concede that

God is pure devil; and although Melville's protagonists rage and deny, they are unwilling to make this concession. Endlessly, they seek ultimate answers. Their failure to unmask them is, as I see it, the tragic theme which joins *Mardi*, *Moby Dick*, *Pierre*, and *Clarel*.

In *Billy Budd*, much the same pattern is repeated. But this time the dilemma is, I suggest, resolved — resolved by a criterion of religious faith Melville would have found in Bayle. It rests not on precise knowledge of God, but upon a sincere belief in the absurd co-existence of a just Deity and temporal evil.

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THE POEMS OF GEORGE TURBERVILLE,
EDITED WITH CRITICAL NOTES AND A STUDY
OF HIS LIFE AND WORKS

(Publication No. 3706)

John Erskine Hankins, Ph.D.
Yale University, 1929

George Turberville, a respected poet and translator, wrote during the first years of Elizabeth's reign. His translations include metrical versions of Ovid, Mantuan, Mancinus, and Boccaccio, as well as prose handbooks of sport. His original poems, which are collected in this edition, show heavy borrowings from Tottel's *Miscellany* and the Latin poets. The notes point out these and other parallels, notably to Erasmus' *Adagia* and to Cornarius' collection of epigrams from the *Greek Anthology*.

Turberville was the first English poet to publish an extended sequence of poems in honor of a particular mistress, in this case Anne Russell, Countess of Warwick. He was among the first, possibly the first, to introduce emblems or "posies" as mottoes for his poems. His works are a faithful "mirror" of literary trends in the years 1560-1575.

The introduction to this volume contains the material already printed in Mr. Hankins' *The Life and Works of George Turberville*, 1940, with several additions not there given. Most important is a chapter on Turberville's vocabulary, showing his use of archaisms and his probable influence on Spenser, a chapter to which the glossary at the end of the book is a useful supplement. Other items are his father's will, his acrostic poems to Ursula Braye, contemporary opinions of his work, and recent discussions of the *Booke of Hunting*. Mr. Hankins repeats his bibliography of Turberville's works and his biographical data on the Dorsetshire Turbervilles — the originals of Thomas Hardy's ancient D'Urbervilles.

Turberville's writings contain numerous allusions to his fellow poets: Richard Edwards, Arthur Brooke, Thomas Twine, Barnabe Googe, James Sandford, Sir Thomas Sackville, George Gascoigne. Mr. Hankins demonstrates his friendship for Arthur Gorges, the Alcyon of Spenser's *Colin Clout*, and seeks to show

that Turberville is the Harpalus of that poem. Turberville's own life was not devoid of excitement. He accompanied a diplomatic mission to Russia and sent home three long poems descriptive of that country. He killed a man in self-defense and was himself seriously wounded. His elder brother was murdered by a brother-in-law, whose trial was noised throughout England. These details add piquancy to the biography of a man who pictures himself as a secluded student and humble man-of-letters.

The text of Turberville's poems has been taken from the earliest known editions and is more nearly correct than any previous reprint. In fact, this is the first time that Turberville's original poems have been collected into one volume. They constitute a significant body of work in the history of Elizabethan poetry.

Microfilm copy of complete manuscript of 712 pages, \$8.90. Enlargements 6" x 8", 10¢ per page.

ENGLISH MUSICAL THOUGHT IN THE SEVENTEENTH CENTURY: A STUDY OF AN ART IN DECLINE

(Publication No. 4218)

Dean Tolle Mace, Ph.D.
Columbia University, 1952

After the death of Henry Purcell in 1695, English musical culture decayed sharply. Historians of music have suggested various sources of this decline: The Puritan hegemony in the seventeenth century; the lack of court patronage; the rejection of opera on the grounds that it did not satisfy the English demand for verisimilitude; the sheer lack of national genius; and the belief that spoken drama simply smothered drama in music.

The first argument has been seriously weakened by Percy Scholes' study of Puritan musical life; the others are incomplete: other forms of art (the theater, for instance) were able to thrive without the patronage of a powerful court; the English stage at that time was not ruled by considerations of verisimilitude; there is no historical evidence that "genius" for certain art forms is a national possession; and finally, the spoken drama by no means drove music from the English stage.

History shows that music does not derive its conventions from universal laws of nature or the "genius" of peoples. The art flourishes in particular epochs simply because those epochs accept the belief that such an "artificial" and variable medium may express valid and true experience.

The decline of English music followed the refusal to "believe" in opera, the indispensable link in the chain of development from the "absolute" music of the Middle Ages to the self-contained generalization of poetic and dramatic elements of modern music.

In England the principle of opera was

misunderstood because the senses were believed to be accurate reporters of "reality" only as they presented facts which were verifiable as materially true. By 1700, deeply affected by Bacon, Descartes, and Hobbes, England (as well as France) was dominated by a materialist view of reality, a view which demanded that the materials in art have exact prototypes in nature; that art be subject to rational analysis.

Since music cannot be reduced to terms equivalent to anything in nature, except sound and rhythm, music could not fulfill the demand made upon art. According to Descartes music could only effect the passions mechanically; Roger North insisted that music was incapable of embodying valid aesthetic experience, because pure sound does not react upon the "judgment." Thus the English abandoned music as a serious art during the Restoration period. Had French opera not enjoyed the patronage of a powerful king, the same thing might have occurred in France.

The belief in the unintelligibility of musical experience began early in the century. This is apparent in Bacon's separation of sound and sense in words. Sound to Bacon was meaningless except as it served in a limited symbolic function in words which represent the realities of matter.

The fortunes of sound, pursued through the Daniel-Campion controversy about rhyme, through Milton's and Lawes' collaboration, and through Hobbes and the speculations of the Royal Society, show an increasing conviction that sound had no significance apart from its function in the word.

In Dryden's operatic theory we can see the effect of such speculation. Dryden, like his generation, could not understand drama in music, because he believed that music was strictly "meaningless." Purcell's *Dido and Aeneas*, the one great British opera of the period, had no successor, because its principles were not accepted by the musical public or the poets with whom he collaborated.

King Arthur, written together by Dryden and Purcell, was the typical English solution of the operatic problem. In this "opera" sound (music) is completely subordinated to extra-aural "sense" (text), and music is completely rejected as the medium of the drama. *King Arthur*, for all its charm, thus symbolizes the decline of music in England.

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THE THEORY AND PRACTICE OF THE NEW THEATRE MOVEMENT

(Publication No. 4086)

Saul Maloff, Ph.D.
State University of Iowa, 1952

Objective

The literature of dramatic history and dramatic criticism in America have been generally neglectful of one phase of their proper scope: the new

theatre movement of the depression decade. As a consequence of this neglect, whatever references to the movement are to be found in studies of American drama have been, as a rule, inadequate and misleading: they have been vitiated by preconception and prejudice, and generally wanting in that soundness of approach and judgment that can come only of sufficiency of information. Nor has this deficiency been remedied with the passage of years and the perspective of time. On the contrary, the most recent scholarship in the area has been even more neglectful than the earlier work, tending to consign the movement to the position of an unfortunate aberration that had best be forgotten. The earlier work had at least the virtue of paying it, in whatever scant measure, the homage of recognition; it was too close to its impact to pretend entirely that it did not exist. Because scholarship cannot with integrity permit bias and animus to obscure or discard the facts of history, it has been the purpose of this dissertation to investigate the mode of existence of a period in the dramatic history of the United States that has never been properly determined.

Method

Because the extant scholarly literature does not contain a coherent history of the new theatre movement, it was necessary to reconstruct such a history from a multitude of scattered fragments. Aside from a number of books and pamphlets which illuminated some aspects of the total historical picture, the primary sources of information out of which the history had to be constructed were the publications, magazines, and periodicals in which the new theatre movement recorded its experience as it lived it; to a lesser extent, newspapers proved of a certain usefulness. These primary sources were invaluable not only for the history of the movement, but for its philosophy, theory, and practice of criticism equally.

There was a similar problem with regard to the movement's artistic achievement. Although a very considerable body of its plays have been published and are readily available, a study of the movement revealed that these do not alone indicate its scope and breadth. The produced plays that were never published exceed by far the number of plays that were commercially published. These are not readily available. Further, the number of plays that were neither published nor produced was very large, and appeared to be valuable for the most comprehensive view of the movement's total accomplishment and identity. Fortunately, a very substantial portion of the unpublished plays became available during the conduct of this investigation. Together with other materials, they help make comprehensive reconstruction possible.

Conclusion

The informing intention of the dissertation was to demonstrate that the new theatre movement in America constitutes a literary period. Within the larger context of the American theatre, it began as an insurgent movement both outside and within the established theatre, and then defined itself

autonomously. In so doing, it founded its own organizations and publications, formulated its own philosophy and ideology, and even evoked its own artistic forms and methods. It developed a corpus of drama that was distinct, in terms of form and content, from other tendencies and types of American drama. Particularly differentiating were the themes it characteristically selected as the subject-matter of its plays, and the manner in which it articulated those themes. Because the subject-matter was extracted from contemporary reality, it was not, of course, the exclusive property of the new theatre; but in the course of translating that subject-matter into the terms of its dramatic art, it came to bear its distinguishing, peculiar stamp. When, with the termination of the depression decade, the new theatre movement was brought to a close, it left an unmistakable print upon the theatrical and dramatic history of the thirties.

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AN EDITION AND TRANSLATION OF THE LIFE OF WALDEF, ABBOT OF MELROSE, BY JOCELIN OF FURNESS

(Publication No. 4215)

George Joseph McFadden, Ph.D.
Columbia University, 1952

Jocelin of Furness is a Medieval Latin writer about whom very little is known. He was a priest, and has been associated with Chester in England and Down in Ireland, besides the Cistercian house of Furness with which he was no doubt connected at the time of his death. His career began in the last quarter of the twelfth century; his *Life of St. Kentigern*, dedicated to Jocelin, Bishop of Glasgow and former Abbot of Melrose, was probably his first work that has come down to us. He is also the author of a *Life of St. Patrick*, dedicated to Archbishop Thomas of Armagh, Bishop Malachy of Down, and John de Courcy, which became the standard legend of the patron saint of Ireland. Besides a *Life of St. Helena*, which exists in two manuscripts, Jocelin wrote, shortly after 1207, a *Life of St. Waldef*, who had been the second abbot of Melrose after its Cistercian re-foundation.

Jocelin, whose racial origin is hard to determine, apparently was familiar with the Celtic dialects of Clydeside, Wales, and Ireland, as well as with English and Latin. To judge by his Latin style he received an education in the humanistic tradition of the school of Chartres; this appears not from his frequent quotation of the classical authors, but because he appears to have mastered their phraseology.

Though he keeps touch with the vernacular of his day, Jocelin is a fastidious stylist. That his Latin is in substantial accord with classical usage is demonstrated by a large number of citations. His extensive vocabulary, with its large number of interesting

medieval coinages, is discussed also. That his work displays a thorough training in medieval rhetoric is shown by quotations which exemplify the teachings of favorite medieval textbooks on that subject. Of the higher literary qualities, he possesses a good ear for rhythm and word sounds, considerable narrative skill, a gift for characterization and the presentation of mental and emotional states, and for the picturesque use of detail. Though the product of a vigorous and even bold intellect, his writing indicates a mind steeped in monastic humility and other-worldliness. Jocelin is obviously deeply interested in the liturgy of the church, quoting or alluding to it upon many occasions. A striking characteristic of his style is the frequency and aptness of his quotations from the Vulgate.

Jocelin, a skilled hagiographer, aimed principally at edification in his *Lives*. He also shows a concern for leaving a record of past events which are likely to be forgotten otherwise. Despite his claim to truthfulness, it is evident that his *Lives* seek to vivify a spiritual ideal rather than to collect genuine data. His method was to compile sources (which he frequently names) and to re-write them; he recognized and rejected plagiarism. He exercised criticism in the use of sources, not strictly historical, but as arising out of his views upon theological and philosophical proprieties. He does not hesitate to use interpolated pious stories, which he often puts into the mouth of his hero. His credibility, therefore, is subject to limitations; it is better to take his *Lives* as products of art than as simple records of events.

Chapter IV of the dissertation is a discussion of the *Acta Sanctorum* text of the *Life of Waldef* (the only extant one; all manuscripts have been lost), published in 1733 at Antwerp by the Bollandists. A number of emendations are suggested and a long lacuna is supplied. Chapter V is a summary of available information on Abbot Waldef and an appraisal of Jocelin's *Life*.

Chapter VI is an edition of the Latin text of the *Vita Waldevi* which includes emendations discussed in Chapter IV and in which the many Biblical and other quotations have been indicated.

Chapter VII consists of the English translation and notes.

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SHAVIAN SOCIALISM AND THE SHAVIAN LIFE FORCE AN ANALYSIS OF THE RELATIONSHIP BETWEEN THE PHILOSOPHIC AND ECONOMIC SYSTEMS OF GEORGE BERNARD SHAW

(Publication No. 3675)

Edwin Burr Pettet, Ph.D.
New York University, 1951

Hitherto, the Fabian-Shavian construction of socialism has been considered distinct from the Butlerian-Shavian Creative Evolution rationalization

which the playwright has named "The Life Force Philosophy." Corollaries of the philosophy which C. E. M. Joad had previously inferred — the function of the artist, the relationship between man and woman, and the moral structure of the philosophy — do not include Shaw's socio-economic principles in the pattern.

An investigation into both the socio-economic and philosophic structures of Shaw reveals, however, the existence of a corollary relationship between them.

In his Life Force philosophy, Shaw maintains that the current of life, operating as will in lower animal forms, at length evolved consciousness. In man, this consciousness, become intelligence, is the "darling" of the Life Force, for by it man is enabled to discover Life's direction, and through it more effectively and rapidly to carry Life to its ultimate goal — the whirlpool of pure intelligence wherein mind shall have completely dominated matter.

In her drive to attain greater control of matter (her purpose) Life had, at some evolutionary step, developed the double-sexed method of reproduction — an advance over the earlier single-sexed process in that it allowed for the recapitulation of the previously acquired experiences and habits of the race. By means of a carefully guarded prenatal period during which all needs of the fetus are provided for with no individual discrimination, Life was able to produce at birth a creature already trained in many of the complicated practices developed by the race and able, because of that training, to make greater strides in Life's direction than would otherwise have been the case.

But in developing the double-sexed process, Life (at that point working without the brain of man which the double-sexed process was later to produce) also developed a paradox (The Life Force can make mistakes, Shaw insists) that, unless resolved, could bring her forward march to a standstill.

The female (primary, the male is secondary) has left the energies of the male free from most of the work of reproduction, according to Shaw. With this freedom, the male has created civilizations and works of art, searched into the nature of life, has done, in effect, the work of the Life Force without consulting woman. Woman, whose preoccupation with reproduction has kept her opposed to any activity aside from the protection and maintenance of herself and offspring found it necessary to hold the male to these duties with the bait of sexual attraction and the institution of marriage. Thus, the purpose of the genius-man (produced by the double-sexed process) is neutralized by the needs affecting the method of his production.

Shaw's socialist principle of equality of income for every man, woman and child held as a birthright is directed toward the resolution of that paradox. By relieving man of the obligation to maintain the next generation and its mother, Shaw's economic plan intends to promote threefold benefits: 1) It frees man to pursue his destiny without wasting his energies on problems of survival and maintenance; 2) it secures for each living unit an equal share in the national wealth, ensuring each the same opportunity (as in the

prenatal state) to develop physical and intellectual maturity for service to the Life Force; 3) it secures for woman the freedom to choose her mate freely without the inhibiting concerns caused by problems of maintenance — thus permitting "natural selection" to operate for the greater glory of the race.

In the sense that these three conditions of Shavian socialism resolve the central paradox of the Life Force philosophy, his economic program may be said to be a corollary of that philosophy.

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FORMAL ASPECTS OF THE METER OF BEOWULF

(Publication No. 3981)

Eva Katherine Touster, Ph.D.
Vanderbilt University, 1951

This study is based upon the concept of significant form as a key to the understanding of a work of literature and upon the conviction that a more flexible attitude toward the scansion of Beowulf than prevails generally would contribute to a heightened perception of the poem in its totality. A survey of pertinent historical and critical works reveals a chaos of theories of Anglo-Saxon versification from which two distinct (but not mutually exclusive) concepts emerge: (1) that of gesungen-vers, early identifiable with the four-beat theory of Lachmann and his followers; later illustrated most notably in the varieties and modifications of musical notation developed by Sidney Lanier, W. E. Leonard, and Andreas Heusler; and finally brought to culmination in J. C. Pope's fusion of temporal scansion with the traditional "types;" and (2) that of spreche-vers, anticipated by early English prosodists; first enunciated as the two-beat theory by German philologists of the last century; given classical expression in Sievers' type-scansion; subsequently rejected by the "timers," by Sievers himself, and by theorists of acoustic metrics; convincingly challenged by Heusler and Pope (of the rhythmists) and by P. F. Baum (of heterodox principles) as an adequate explanation of meter but acknowledged as useful tools of prosody. The present writer's recognition of the limitations of musical measures, type-scansion, and acoustic metrics as descriptions of meter resulted in the development of a system of symbols designed to represent the fundamental metrical movement of Beowulf rather than rhythmic variations and patterns of stress inherent in the language. This mode of scansion issued from the two-fold view of the epic which underlies this study: (1) Beowulf as book-poetry to be read (not chanted or sung) according to the requirements of alliteration, logic, and "dissyllabic diphthongs" determined on phonological grounds; (2) the foundation of the meter as an interweaving of two- and three-stress verses and rising and falling cadences according to the artistic principle of diversity in uniformity.

Scansion of the epic and close analysis of the linear units of three stresses in a representative group of Anglo Saxon poems reveals a metrical peculiarity in Beowulf with regard to the position in the half-line and the rhetorical function of the three-beat verses. Intensive study of the arrangement and use of these verses in Beowulf in connection with the "larger rhetorical patterns" of the poem and the generally accepted two-fold structure of the plot shows that the two major narrative sections can be differentiated on the basis of poetic organization and that the relationship between meter and rhetoric in the passages distinguished by the phenomenon of the "heavy unit" is more significant in Part I than in Part II. The ultimate conclusion of this section of the study (that a slight but real difference between the two parts of Beowulf exists in the prosody) is reinforced by a rather large body of objective data assembled in the examination of the linear unit throughout the poem.

The facts and judgments issuing from this analysis, when applied to problems of structure and style, suggest (1) that the author of Beowulf employed the "heavy unit" as an artistic device and (2) that the dragon episode is a separate poem composed by the author of the Grendel story, made to conform to the (probably) earlier poem and designed either to serve as a sequel to it or to complete the development of the original theme in a narrative newly conceived in epic proportions. Compatibility of these findings with those of other investigations of the style and structure of Beowulf suggests the value of this study as a foundation for literary criticism.

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HENRY JAMES: THE ART OF REVISION, A COMPARISON OF THE ORIGINAL AND REVISED VERSIONS OF THE AMERICAN

(Publication No. 4245)

Isadore Traschen, Ph.D.
Columbia University, 1952

Henry James's revisions are an important aspect of his last period, and in any final consideration of it they cannot be neglected. When James reread his early works in preparation for the New York Edition, he saw an array of waiting misfits disfiguring every page, and there was no alternative for his artistic conscience but to revise in terms of the exacting standards of his maturity.

The American, reissued in 1907, underwent the most extensive revisions. While most changes involved a word, phrase, or sentence, James frequently rewrote several paragraphs in sequence, and once added two pages. There were occasional deletions, usually of a sentence or two, rarely a paragraph, though in three instances somewhat less than a page was cut.

Style is the form that meaning takes; meaning is realized through character in action; the revisions,

consequently, were organized into a narrative sequence roughly corresponding to the principal actions, and around the several characters.

The revisions argue impressively for James's sense of form. A maximum pressure of meaning was exerted at many points. Significant aspects of characters were highlighted, and antitheses between them sharpened. The clash of social orders was reflected in groups of business and feudal images. Ironies were realized and correspondences reinforced. The large number of images - the most notable stylistic change - were organized into a sequence which figured the principal developments. Recurrent, yet changing images provided dramatic metaphors of a character's history.

James wanted to promote an illusion of realism in his romantic tale. Images of business reflected Newman's values, and often provided a humorous counterweight in the romantic portrait of Claire de Cintré. The humor of Tristram and Valentin was also enlisted in this cause. By heightening Newman's innocence, James later taught him a more affecting lesson in evil, made his loss severer, and his final relinquishment of power morally greater. Newman's awareness from moment to moment was deepened. Mrs. Tristram - and Mrs. Bread - is more intimate with Newman; this closer relation between confidante and hero welds technique and subject.

But James, charmed by his romantic conception of The American, also took pleasure in touching up its romantic aspects. He stressed Newman's large proportions, his general magnificence, and his equation with the nobility. Tenderness was realized in the love affair, though the intenser moments were reflected ambivalently. While an extreme, aggressive masculinity marked Newman's embraces, passivity dominated his sexual fantasies. The ambivalence is undoubtedly relevant to James. Continuing, Newman's innocence was developed through many images of school, nature, and America, and his enchantment with the old French aristocracy was heightened at the Bellegardes' grand fête. James's sense of dramatic structure was evidenced in the extensive reworking of this critical scene.

Appendix "A" samples the virtues and vices of James's style, in the narrow sense of that word. Newman's speech, for example, is shown to be more colloquial, idiomatic, and figurative, though it is often corrupted by James's later diction and turns of speech. There is a notable increase in the rhetorical tools of alliteration, repetition, antithesis, balance, and parallelism, tools for precision, energy, and compression. In general, the simple intention of The American neither required nor induced the subtleties of James's later style. Appendix "B" examines the contributions of other studies of the revisions, while Appendix "C" demonstrates that the play version of The American had almost no effect on the revisions.

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THE LAST ILLUSION: EXAMPLES OF THE SPIRITUAL LIFE IN MODERN LITERATURE

(Publication No. 4249)

Robert Dean Wagner, Ph.D.
Columbia University, 1952

The dissertation attempts to set forth a conception of spirituality and moral order suitable for the contemporary world and to interpret and criticize important works of modern literature in the light of this conception. The first chapter briefly summarizes the two major forms that the spiritual life has taken in the past - the balanced idealism of theistic religion and the unbalanced idealism or (as in the philosophy of Bergson) the anti-idealism of a pantheistic worship of nature. It is the conclusion of the chapter that since the morality of theism is now impossible and the morality of pantheism inadequate, a necessary reconstitution of the ideal can be accomplished only through belief in disillusion with respect to all beliefs, including the belief in disillusion itself - "disillusion as the last illusion." It is also affirmed (here and throughout the dissertation) that a valid literary criticism cannot pretend to ignore moral choice - in the critic or in the artist - and its implications; for aesthetic judgment is, at bottom, a reflection of moral commitments.

The second chapter is devoted to an analysis of A La Recherche du Temps Perdu, the most successful literary realization of a philosophy of disillusion. Particular attention is given to the theoretic vision that shapes the action of the novel and which is itself the fruit of that action. It is noted that the spiritual fortunes of the protagonist - his distractions, momentary liberations and ultimate salvation - follow the pattern of Christian redemption without depending on the sanction of Christian supernaturalism. Rather, art itself, which alone sustains the spiritual life in default of all literal beliefs, becomes, in the person of Proust's narrator, the exponent of moral order.

The subject of the third chapter is the failure of three modern writers, W. B. Yeats, D. H. Lawrence and Virginia Woolf, to reconstitute a valid moral order in terms of creative art. In the case of Yeats, admittedly the greatest poet of his time, it is assumed that his unwillingness to accept a world without divinity - though in fact he could find no other world - prevented his commitment to disillusion, and left Yeats without a central discipline for an art of total vision. His masterpieces, "Sailing to Byzantium," "The Tower" and "Among School Children," remain the lyric fragments of a mind unable to achieve moral resolution. In Lawrence, on the other hand, the resolution achieved does not satisfy the demands of the spiritual life and, as embodied in his major novels, is at odds with the function of art itself. In Women In Love and The Plumed Serpent, Lawrence's religion of the blood, failing to issue in a religion of the spirit, prohibits that clarification of reality which alone redeems and enhances life, and makes of it proper material for story. Virginia Woolf's chief shortcoming reverses Lawrence's. Her over-spiritualization of nature (as seen in To

the Lighthouse), her too-literal imposition of pattern on the wayward stream of consciousness, does not allow that pattern, valid though it is in itself, to rise naturally out of life and so appear to live a life of its own in her fiction.

The fourth chapter is divided into two sections. The first takes up the controversy between T. S. Eliot and I. A. Richards concerning the possibility of separating poetry from belief. Such a separation is in fact impossible since belief is always implicit in any act of the human consciousness, even if this act be the rejection of belief. A consideration of Coleridge on Imagination finds that a disillusioned faith in the imagination apart from its objects can become the cornerstone of a positive, total view of life. In the second section an analysis of *Four Quartets* stresses Eliot's attempt to transcend modern self-consciousness by assenting to and exploring the ideal objects of imagination. It is the poet's faith that he will one day know those objects with utter conviction.

A concluding note suggests that Christian theism, as found in Eliot, cannot view the world with the charity and relish of a philosophy of disillusion.

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GENERAL LITERATURE AND LINGUISTICS

AMERICAN AUTHORS IN SOVIET RUSSIA: 1917-1941

(Publication No. 3876)

Deming Bronson Brown, Ph.D.
Columbia University, 1951

From 1917 to 1941, the works of more than two hundred American authors, representing nearly every aspect of the American writing of the nineteenth and twentieth centuries, were translated in Soviet Russia. The purposes of this study are: (1) to determine the chronological and thematic patterns in Soviet publication of American works; (2) to disclose the attitudes of Soviet critics toward twenty representative authors, with special emphasis on Walt Whitman, Mark Twain, Jack London, O. Henry, Upton Sinclair, Sherwood Anderson, Theodore Dreiser, Sinclair Lewis, John Dos Passos and Ernest Hemingway and (3) to determine, insofar as possible, the reactions of Soviet readers to these authors.

During the period of War Communism (1918-1921), publication of American works was small and confined to pre-revolutionary favorites. Under the New Economic Policy (1922-1928), translations increased tremendously. Dozens of new American authors, of the most diverse types, became available to the Soviet reader. This period of relative catholicity ceased with the beginning of the First Five-Year

Plan (1929-1932). In the middle and late thirties, a greater quantity and wider variety of American writing once more became available, but American literature never regained the position it had enjoyed during the NEP.

Four main types of American writing were translated: (1) nature and adventure stories, in primitive or exotic settings, such as those of London; (2) humorous, lightly satirical and sentimental writing of a diverting character, as typified by O. Henry; (3) works of social, economic and political protest, as exemplified by Sinclair and (4) the critical realism of such writers as Dreiser, Dos Passos and Lewis. All of these types, including many current American favorites, were liberally represented in the twenties. In the thirties, the protest novelists and critical realists predominated, and contemporary popular fiction was deemphasized. This was chiefly the result of official publication policy under the Five-Year Plans.

Soviet literary criticism, although Marxist in inclination, was relatively eclectic in the early and middle twenties. After 1928, however, the critics strongly favored works which emphasized psychological, social, political and economic maladjustments in capitalist America. They admired the documentary realism of such authors as Sinclair, Dreiser and Dos Passos; the social satire of Twain and Lewis; and the ability of such writers as Anderson and Hemingway to depict social and psychological crisis. On the other hand, they were nearly always disappointed in their search for a revolutionary ingredient, for all of the writers considered here were found lacking in "proletarian" ideological orientation. It was in terms of this ideological deficiency that the critics explained such traits as the morbidity of Bierce and Hemingway, the individualism of London, Dreiser's fatalism, Sinclair's pacifism, Anderson's Freudianism, and the sentimentalism of O. Henry.

Rigidity of esthetic doctrine and the obligation to adhere closely to the Party line caused the critics to represent the opinions of readers with only partial accuracy, particularly in the thirties. They correctly asserted that such qualities as the elemental vigor of London, the collectivism of Whitman, and the narrative charm of Twain and Hemingway held a special fascination for the Soviet reader. Likewise, the social criticism of Dreiser, Sinclair, Anderson, Lewis, Dos Passos and others exerted a strong appeal, as the critics contended. However, American humor, themes of love and death, and moods of pessimism, morbidity and sentimentalism also attracted the Soviet reader, and this the critics implicitly denied. Official literary and political doctrine also compelled the critics to minimize the "escape" value of American literature for the Soviet reader. Finally, contrary to the statements of the critics, the reader was impelled by admiring curiosity about American life, and found a rich source of information in our literature.

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CRITICAL OPINION OF ROMAIN ROLLAND IN THE UNITED STATES

(Publication No. 4190)

Bitá May Hall, Ph.D.
Columbia University, 1952

Within this treatise were considered all comments written in the United States, whether in books, periodical articles, or book reviews, concerning Romain Rolland and his works. In a few instances personal letters and interviews have been drawn upon. All material was approached as though to answer the questions: What do Americans think of Rolland, of his books, and of certain features of his writing? and What is their reaction to his ideas? Adverse criticism in France of weaknesses in Rolland's literary works, and later open hostility to his liberal internationalist views, affords opportunity for contrasts in national tastes.

Before approaching the writings of Rolland we considered the man as a personality. *Vitae* gleaned from American sources furnished a very acceptable biography, although most of the more intimate glimpses were furnished by the three or four Americans who had paid him visits. General estimates of Rolland revealed that he was held in the highest respect and esteem by Americans.

Comment about his writings was organized according to genres, with a loose approximation of chronological order: drama; musical essays and biographies of several artists; fiction, including three short novels as well as the two multi-volumed ones, *Jean-Christophe* and *L'Ame enchantée*; and a final chapter entitled, "From Internationalism to Pan-Humanism," covering his pacifist and internationalist tracts during and after World War I, biographies of Tolstoy, Gandhi, and two Hindu Mystics, with a final section on his interest in the Russian Revolution.

In two of these fields American reaction followed closely the trend of the French: None of the dramas achieved marked success in either country. In France the press was more hostile than the audiences, but in New York runs were short for the two plays produced, and published dramas were credited with more good intentions than dramatic achievement.

As a musicologist, Rolland early commanded respect in France for his ability to present in a fascinating manner well-documented scholarly research, revealing facts about long-neglected composers. After renown accruing from *Jean-Christophe* brought the musical essays to the attention of Americans they also appreciated the contributions of Rolland's scholarship. But the insufficient musical knowledge on the part of reviewers prevented their realizing fully that the humanitarian turn taken by Rolland's thinking -- as evidenced in his series of *Heroic Lives* -- was so coloring his later writing as to diminish his critical powers.

The work for which Rolland was first recognized in America, *Jean-Christophe*, furnished inspiration to many a youth at the beginning of the twentieth

century. That the style was diffuse, at times discursive, the balance uneven, and the length overwhelming, did not dim the enthusiasm of readers, although in France, where clarity and conciseness are a point of pride, these literary failings precluded whole-hearted endorsement. In America, although such imperfections were realized by some critics, on the whole such concern did not seriously diminish appreciation for the ideals within the novel.

With Rolland's stand in 1914, resentment in France, previously mild, now became bitter. But because for Americans Rolland was not deserting their country to preserve his intellectual liberty "above the battle," and because at that time they were striving to remain neutrals in the war, on the whole they exonerated, even admired, his firm stand. The same was not true when he sympathized with the Russian Revolution, even though he constantly warned against its excesses of violence. No American praised his "independence of mind" in this Communist direction. But when he wrote about Hindu Mysticism, they tolerated -- with skepticism perhaps but not with scoffing -- a subject admittedly strange to American minds.

Microfilm copy of complete manuscript of 496 pages, \$6.20. Enlargements 6" x 8", 10¢ per page.

THE INFLUENCE OF MUSIC ON AMERICAN POETRY

(Publication No. 4003)

Charmenz Shirley Lenhart, Ph.D.
University of Illinois, 1952

Aside from the publication of Lanier's *The Science of English Verse* in 1880, there had been no major work exploring the relationship of music and poetry until Calvin S. Brown's *Music and Literature* in 1948 -- a book which extended its scope to embrace all western literature and prose as well as poetry. Virtually nothing of a like nature had been done for American poetry until the publication last year of Robert Faner's *Walt Whitman and Opera*. This present study, confined to American lyrical poetry, and historical in approach, was undertaken to determine the importance and the extent of the influence of music on American poetry and to examine the various ways in which music has influenced verse.

Music may be said to have exerted an influence on American poetry in two directions: (1) on the content, as imagery -- instrumental and vocal, and as symbol and subject; and (2) on the mechanics of poetry, the rhyme, rhythm, tempo and alliteration. Music influenced not only what was said by lyric poets, but also how it was said.

A seventeenth century poet like Edward Taylor made extensive use of musical symbol and imagery to express his worship of God. Anne Bradstreet cast her verse into the form of the hymn, and the *Bay Psalm Book* verses were all written to known melodies. Tributes to "music" became more common in the following centuries.

Poets, like Francis Hopkinson and, later, Sidney Lanier, attempted to imitate musical forms such as the cantata ode and the symphony in their verses. They reveal a much more profound understanding of music than the early poets. Many nineteenth century poets wrote their verses to operatic melodies and ballad airs. Some few poets, like Whitman and Lanier, even attempted to capture in verse the exact "impression" of some particular piece of music to which they had been listening. Certainly Poe, Whitman, and Lanier made the most extensive and subtle use of music in their verse in the century.

Poe, strongly influenced by the song and by opera, preferred the sounds of the human voice to instrumental music. His poems reveal his conscious efforts to write poetry like music. He called music the most "divine" of the arts, and his poems are filled with musical images of a deliberately nebulous and "transcendental" character. He experimented with quantities in rhythm and claimed rhythmic dissonances arose from the subtlety of his ear. He employed much cross alliteration in his verse, forming a melodic pattern.

Whitman, who heard more music than most American poets, used music symbolically, much as the transcendentalists had. He often improvised verse while at a concert. From a thorough search of the Whitman notebooks at Duke University we know that he consciously sought for musical forms in which to cast his verse. He came under the influence of Beethoven's symphonies, and *Leaves of Grass* was almost certainly organized along symphonic lines.

Lanier developed new forms in verse by attempting to write word choruses and symphonies. The intricate rhythmic and alliterative pattern of his later verses developed from his theory that syllables can be handled like notes in music. His last verses are pure musical impressions.

By no means conclusive, this study emphasizes the fact that lyrical poets, consciously and unconsciously, seek musical parallels, and that their awareness of music has determined, in large part, the kind of poetry that they wrote.

Microfilm copy of complete manuscript of 433 pages, \$5.41. Enlargements 6" x 8", 10¢ per page.

GERMAN LITERATURE AND LINGUISTICS

HÖLDERLIN ALS ERZIEHER

(Publication No. 3699)

Max O. Mauderli, Ph.D.
University of Pennsylvania, 1948

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Hölderlin ist kein Pädagog. Im weiteren Bereich der Bildung und Erziehung aber, wo die metaphysische Existenz des Einzelmenschen und des Volkes berührt wird, erscheint die Gestalt dieses Dichters mit prophetischer Gewalt. Es ist kein Zufall, dass wir uns gerade in einer Zeit, in der die zivilisierte Ordnungswelt sich mühsam gegen die chaotischen Mächte zu verteidigen sucht, mehr denn je Hölderlin zuwenden.

Dass ihm das Amt eines Hofmeisters und Schullehrers nicht genügen konnte, weil sein Streben weit über diese berufliche Tätigkeit hinausreichte, hat schon Charlotte von Kalb, die Mutter seines ersten Zöglings, eingesehen (VI, 249). Die Empedokles Fragmente zeigen dann, dass er innerlich auch der dogmatischen Kirche - und damit dem Pfarrerberuf - fremd gegenüberstand. Er stand, nachdem er im Tun und Denken der Menschen nur noch leblose, erstarrte Formen zu sehen vermochte, der ganzen menschlichen Gesellschaft fremd gegenüber. Und doch verband ihn mit den Menschen eine Liebe, die ihn nicht los liess und die es ihm unmöglich machte, sich von den Geschicken und Problemen der Menschen und Völker abzuwenden.

Hölderlin unterscheidet die menschliche Gesellschaft und die Menschheit. Der Menschheit, sagt er, gelte seine Liebe; aber die menschliche Gesellschaft - ihre Denkformen, Tätigkeiten, Institutionen - lehnt er ab. Besonders deutlich in der Hyperionrede an die Deutschen, wo statt Handwerker, Denker, Priester,

Knechte und Herren Menschen gefordert werden. Die menschliche Gesellschaft ist die Mannigfaltigkeit dessen, was die Menschen von sich aus tun und denken; die Menschheit aber ist das, was die Menschen als Wesen der Gottheit sind. In diesem Sinne unterscheidet Hölderlin Form und Leben.

Und seine Aufgabe besteht nun darin, durch die Formen der menschlichen Gesellschaft hindurch die lebendige Menschheit zu finden: also das, was am Menschen unzerstörbares, göttliches Leben ist. In den Auseinandersetzungen zwischen Empedokles und Hermokrates geht es im Grunde um nichts anderes als die Befreiung dieses Lebens aus den herkömmlichen erstarrten Formen. "O gebt euch der Natur, eh sie euch nimmt!" (III, 146). Und derselbe Gedanke in *Germanien*: "O trinke Morgenlüfte, bis dass du offen bist" (IV, 184). Dadurch, dass man sich von allem geschichtlich Ererbten befreit - den Gesetzen, Sitten und Gebräuchen und selbst den Namen der alten Götter - wird man zu neuem Leben fähig (III, 146). Schon im *Hyperion* ist das so. Denn wenn es von Grund aus anders werden soll: wenn aus der Wurzel der Menschheit eine neue Welt entstehen soll: wenn eine neue Gottheit über der Menschheit waltet und eine neue Zukunft sich aufklärt (II, 199), dann ist auch das Ende einer geschichtlichen Periode verkündet. Die Frage ist nur, welche Rolle der Dichter in dieser bedeutsamen historischen Übergangszeit spielt.

Nach Diotima soll er Erzieher seines Volkes werden und ein grosser Mensch sein. . . (II, 199): als grosser Mensch die kleineren Menschen belehren und bilden. Dabei denkt Hölderlin nicht nur an eine Mehrung des Wissens, sondern an eine Herzens- und Geistesbildung. "Das Interesse für Philosophie und Politik, wenn es auch noch allgemeiner und ernster wäre, als es ist, ist nichts weniger als hinreichend für die Bildung unserer Nation" (II, 368). Eine richtig verstandene Kunst - die echte Dichtkunst - die die Menschen einander annähert und vereinigt, ohne die lebendigen Eigentümlichkeiten der Einzelnen aufzuheben, scheint für die Bildung eher hinreichend zu sein. Es war nach Hölderlins Vorstellung ja auch schon bei den Griechen so, dass der Dichter - oder der Künstler überhaupt - der eigentliche Bildner der Menschen und Völker war. Die Verhältnisse haben sich aber inzwischen geändert, und Hölderlin sieht sich, wenn er im tieferen Sinne Erzieher und Bildner sein will, vor eine messianische Aufgabe gestellt.

Herzens- und Geistesbildung ist nicht nur ästhetische Erziehung, sondern religiöse Bekehrung. Sich von den Formen befreien und von den Kräften der Natur ergreifen lassen, heisst hier Rückkehr zum lebendigen Gott. Der im Sinne Hölderlins gebildete Mensch ist ein göttlicher Mensch, und kann nur von einem Leben in ein immer höheres Leben hinüberwechseln. Er ist unzerstörbar. Er ist frei und mächtig, und kann jedwedes Schicksal ertragen. Ein Mensch, dessen Fühlen und Denken darum sinnvoll und harmonisch ist, weil es bewusst im Einklang steht mit dem göttlichen Weltganzen.

Microfilm copy of complete manuscript of 227 pages, \$2.84. Enlargements 6" x 8", 10¢ per page.

ORIENTAL LITERATURE AND LINGUISTICS

A CRITICAL AND COMPARATIVE STUDY OF THE OLD LATIN TEXTS OF THE BOOK OF EZEKIEL AND THE MINOR PROPHETS

(Publication No. 4265)

Andrew Panyik, Ph.D.
Princeton University, 1938

Abstract not available.

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ROMANCE LITERATURE AND LINGUISTICS

DIDEROT'S REFUTATION OF HELVÉTIUS

(Publication No. 4172)

Douglas George Creighton, Ph.D.
Columbia University, 1952

Introduction

The philosophies of Diderot and Helvétius have often not been adequately differentiated between. In spite of certain basic similarities in psychological and ethical convictions, significant differences exist in their thought which it is the purpose of this dissertation to bring out.

Part I: Psychology

The empirical psychology of John Locke is the source of most psychological ideas in eighteenth-century France. Condillac, its chief exponent there, further analyses and simplifies the human mind. In Helvétius we find an analogous development, all functions of the mind being reduced to sensation. Diderot, though empirical in his approach, is never dominated by the extreme sensationalist point of view.

Helvétius's identifying of thinking and feeling brings Diderot to doubt his own theory of the general sensibility of matter, because, in establishing this identity, Helvétius reduces man's activity to physical sensibility as a cause. Diderot proclaims differences between a thinking and a feeling being, stressing the rôle of the brain as an organ of synthesis and showing the inadequacy of Helvétius' theory of motivation.

Four factors in the formation of the mind are considered. Physical organization is the essential psychological determinant for Diderot. Helvétius, with a simplified conception of organization, dismisses its influence; for him, neither keenness of senses, memory, nor capacity for attention has any relation to physical organization. For Diderot they are determined by it, as are many other intellectual functions, order in which is based on the order in Nature. The influence of physical environment is denied by Helvétius, affirmed by Diderot. The importance of

chance and education, to which Helvétius attributes all intellectual differences, is restricted for Diderot by natural inequalities.

Part II: Ethics

Physical organization, set aside by Helvétius, has, for Diderot less influence over behavior than over intelligence. Both men are deterministic in their attitudes.

Pursuit of happiness is the basic ethical fact, a primitive tendency which must be the basis of ethics. Helvétius looks to political measures for increase of happiness; for Diderot it is a purely individual matter, varying with organization, though legislation can help.

For both, ethics is social; both are utilitarian, Helvétius more explicitly. According to Helvétius, private interest can be identified with public interest by legislation and education. Diderot claims that certain natural forces limit their efficacy; nevertheless, bad laws are the cause of much misery. Virtue always produces happiness, Diderot proclaims in contradiction to his naturalism.

Civilization can create maximum happiness for man, according to Helvétius. Diderot finally agrees, in spite of primitivistic tendencies.

Legislation, Helvétius declares, is prior to the concept of justice. Diderot, originally agreeing, is brought to question any such priority.

Conclusion

Helvétius "esprit systématique" led to characteristic ways of thinking which aroused Diderot to refutation. But he expresses admiration for Helvétius, under-estimating the vitiating effect of Helvétius's paralogisms. The *Réfutation* brings out the breadth of Diderot's materialism, pointing out for the first time some of its peculiarly human implications, expanding on others. Diderot is made aware of the changes which his evolving thought has brought to traditional sensationalist problems.

Microfilm copy of complete manuscript of 303 pages, \$3.79. Enlargements 6" x 8", 10¢ per page.

THE RELATIVE FREQUENCY OF CORRELATIONS AND OPPOSITION PHONOLOGIQUES IN MODERN FRENCH

(Publication No. 4057)

Patricia Deitz, Ph.D.
State University of Iowa, 1952

The first part of this dissertation is a statistical study. Using the words listed in Vander Beke's *French Word Book*, the frequency of the *corrélations* and *oppositions phonologiques*, both consonantic and vocalic, was established for the most common words in printed French. We consider the figures of relative frequency, when compared with the figure of maximum frequency found in each group, as indicative of the absolute frequency of the oppositions. In addition, statistics were made to determine the

word structure of the one syllable words which form the "couples" containing the oppositions between phonemes. We then tried to show how the combined study of both sets of statistics may supply useful linguistic information.

In the second part of the work, an endeavor was made to demonstrate how the figures of relative frequency may provide new and often more exhaustive interpretations of observations established in fields of study in which the viewpoint differs from that of phonologie. In doing so, we dealt with the child's acquisition of language and vocalic modulation, hiatus, emphatic repetition, alliteration, and rhyme in French poetry.

Microfilm copy of complete manuscript of 59 pages, \$1.00. Enlargements 6" x 8", 10¢ per page.

FRAY DIEGO DE ESTELLA

(Publication No. 4178)

Xavier Alvarez Fernández, Ph.D.
Columbia University, 1952

Diego de San Cristobal was born in Estella, province of Navarra, Spain, in the year 1524. While attending Salamanca University, he joined the Franciscan Order, assuming the name of Diego de Estella.

After ordination, he was assigned as preacher to Princess Dona Juana at Lisbon, Portugal. There he published *Vida de San Juan Evangelista* (1554). Later transferred to Philip II's court in Toledo, he published his famous *Libro de la Vanidad* (1562), an ascetical treatise translated soon after into several languages.

Following the court to Madrid, he openly criticized some of its officials (especially Bernardo de Fresneda, the King's confessor) for their corrupt practices. Relegated to a monastery in the provinces, he sent a memorandum to Pope Pius V about conditions in the Royal Court, and during the several years of his forced seclusion he revised his *Libro de la Vanidad*, adding to it two hundred chapters, and completed a scholarly commentary in Latin on the Gospel of Saint Luke.

Due to changes within the Order, Estella was set free, going to Salamanca, where he published the new *Vanidad del Mundo* (1574), a treatise on preaching entitled *Modus concionandi* (1576), his celebrated *Cien Meditaciones del Amor de Dios* (1576), the *Commentaries on St. Luke* (1574-1575), and its revised edition (1577-1578).

The Inquisition, finding some objectionable passages in the *Commentaries*, started proceedings against Estella, which were interrupted by his death in 1578, at the age of 54.

Diego de Estella combined in his writings a thorough knowledge of ecclesiastical sciences with the humanistic trends of the period. His was an eclectic mind, rather than original, as he gathered freely from previous writers, both Pagan and

Christian. Outstanding among his sources were: Gregory the Great, Saint Augustine, Saint Bernard, Thomas a Kempis, Raymond of Sabonde, Seneca and Erasmus.

Estella was foremost a moralist, always austere, yet calm and serene in his first edition of the *Libro de la Vanidad*, while bitter and even sarcastic in its later revision. His attitude toward moral corruption in the Church and at the Royal Court is commendable because of its sincerity, but it is too often marred by rhetorical exaggeration and rashness of expression. In his *Meditaciones* his own thoughts on the love of God are beautifully woven with those of previous authors. His influence in shaping the devotional feelings of both Catholics and Protestants ranks second only to Luis de Granada among Spanish religious writers of moral treatises.

His originality as a writer rests almost exclusively on style and composition. His style presents four successive stages. In his *Life of St. John the Evangelist*, he closely imitates the "plateresque" style of Guevara. His *Libro de la Vanidad*, patterned after the *Imitation of Christ*, is marked by a careful choice of words, and simple, well-balanced sentences. In the second enlarged edition of the same work he introduces new stylistic features, namely, a veritable profusion of similes and biblical examples, paradoxically intermingled with short, antithetic phrases, conceptual and verbal subtleties and a rich display of aphorisms. In this respect he is truly a *conceptista*. Finally in his *Meditaciones*, in contrast with his other works, the phrase is longer, the words more select, the style uniform, thereby striking a happy medium between the simplicity of his *Libro de la Vanidad* and the more sonorous prose of Luis de Granada.

As a writer, Fray Diego de Estella does not rank as high as Luis de Granada or Luis de Leon, but, because of the unique features of his style, he deserves greater consideration than that which is given him in Spanish Literature.

Microfilm copy of complete manuscript of 343 pages, \$4.29. Enlargements 6" x 8", 10¢ per page.

COSTUMBRISMO IN THE SOCIAL NOVEL OF THE CENTRAL ANDEAN REGION

(Publication No. 4089)

Mary Louise McNeil, Ph.D.
State University of Iowa, 1952

This investigation has been motivated by the fact that although critics of Spanish-American literature consider *costumbrismo*, or descriptions of local customs, as an important element in the novel of social protest, no previous study has been made to determine the extent of its use by the social novelists or the methods by which descriptions of customs have been employed in the novels as a background for the criticism which is their purpose. A preliminary reading of some forty works described

as "social novels" by authorities revealed that approximately half make use of *costumbrismo*.

Costumbrismo in the Spanish-American novel grew out of a *costumbrista* movement, patterned after Spanish models, which developed in the periodical literature of the nineteenth century and drew the attention of writers to the customs of their own countries. Because of the predominantly native population of Peru, Bolivia, and Ecuador, Indian life and customs provided a rich source of material. The first novels on the Indian theme were romantic, dwelling upon the picturesque aspects of native life. Clorinda Matto de Turner's *Aves sin nido* in 1889, which the author terms a "novela de costumbres," was the first novel to deal realistically with the Indian problem. In the twentieth century many writers have utilized the novel to voice their criticism of the unjust treatment of the Indians by the landowners, the clergy, and representatives of the civil government.

The description of customs is a particularly important factor in those novels of protest which deal with the rural Indian of the Sierra, because in that region native ways have changed little through the years. Two types of Indian communities appear in the novels. One is the *ayllu*, an independent organization of pre-Incan origin, where the people still follow the customs of their ancestors. The other is the Indian community which is part of the estate of a powerful landowner.

The approach of the novelists of social protest to the Indian problem is not always the same. One group of writers, Ciro Alegría, Serafín Delmar, and Raúl Botelho Gosálvez in particular, presents a picture of uncomplicated Indian life in the *ayllu* before the white man begins to encroach upon the rights of the people. The second group, composed of such novelists as Jorge Icaza, Fernando Chaves, Jorge Fernández, and Alcides Arguedas, writes about Indians who are under the domination of the landowner from the beginning. The purpose behind the use of descriptions of customs varies from one group to the other.

In these novels descriptions of customs are used for one of three reasons: (1) to revive interest in features of the ancient culture which are worthy of preservation; (2) to present almost idyllic pictures of the happy life in communities where Indians follow their old ways without interference as a striking contrast to the misery brought by the white man's intrusion into their affairs; and (3) to show how the white man has taken advantage of native customs to exploit the Indian or how he has imposed new customs designed to destroy the Indian's rights. Since the novel of social protest is a vehicle of propaganda, the last two predominate.

The social novelists have made skilful and effective use of *costumbrismo*. The adaptation of such material to propaganda purposes is not new; from the beginning the writers of the *costumbrista* sketch called attention to conditions which they considered in need of reform. However, the use of this technique as a weapon in a bitter and fundamentally important class struggle is a new

development, and one which has demonstrated its value.

Microfilm copy of complete manuscript of 231 pages, \$2.89. Enlargements 6" x 8", 10¢ per page.

ALONSO DE PROAZA, REPRESENTATIVE FIGURE OF THE SPANISH RENAISSANCE

(Publication No. 4217)

Dean William McPheeters, Ph.D.
Columbia University, 1952

This study was undertaken in order to determine the relationship of Alonso de Proaza, early XVIth century Spanish humanist, to the *Celestina*, a work which he edited and in which numerous scholars have suggested varying degrees of intervention by him. There are also two secondary problems involved: the role of Proaza in the evolution of the three different states of the *Celestina* in the earliest versions known to us — Burgos, 1499; Sevilla, 1501; and Sevilla, 1502 — and the attribution to Proaza of dramatic works — the non-extant *Farsa en coplas*, S., listed under his name in the *Registrum* of Ferdinand Columbus, and the three *Celestinesque* comedies, the *Thebayda*, *Ypolita*, and *Serafina*, printed in Valencia around 1520.

An attempt was made to shed new light on Proaza's life and activities, his Castilian and Latin works were analyzed, and this material was evaluated according to a historical comparative method, with a metrical analysis of the poetry. In addition, an effort was made to ascertain the actual duties of correctors or editors of the period. All the early pertinent editions of the *Celestina* were examined, with special emphasis on the corrector's own verses, past studies of the text of the *Celestina* as a whole have not yielded particularly conclusive results, perhaps because not all the key editions were available for comparative study.

Reaching definite conclusions about the various printings of the *Celestina* is made difficult by the lack of the hypothetical Salamanca, 1500, version, which would be the second known state of the work. Certain alternatives can be suggested in this connection. The 1499 and 1501 *Comedias* contained only sixteen acts; the *Tragicomedia* of 1502 is the first in twenty-one acts, and contains material which could have been added under the supervision of the corrector or of the printer. It cannot be stated with absolute certainty that Proaza edited the 1502 Sevilla edition since he had already corrected the Sevilla edition of 1501 or, possibly, had served as corrector for the first and last time in an even earlier Salamanca 1500 version. Therefore, the 1502 Sevilla printing could reproduce the last-mentioned edition, or it could contain material added by the printer to the 1501 *Celestina* without the direct participation of Proaza.

From a knowledge gained of his literary ability and psychology, it seems doubtful that Proaza could

have added the five *autos*, or *Tractado de Centurio*, to the *Celestina*, although he may have made some alterations in the accompanying prologue and author's verses. Similarly, he did not possess the irreverent spirit of the author of the three *Celestinesque* comedies, and, in addition, the attribution to him of their authorship is, in all probability, anachronistic since his known literary activity ceased in 1515.

This study shows that in many ways Proaza was typical of the Spanish Renaissance and that he played an important part in the development of certain genres. His outlook was a combination of current humanistic and traditional elements. He was not a genius of the stamp of Fernando de Rojas, author of the *Celestina*, but was a good Latinist and a competent editor.

Microfilm copy of complete manuscript of 305 pages, \$3.81. Enlargements 6" x 8", 10¢ per page.

MUSIC

MUSIC AND SPACE: A STUDY IN THE PHILOSOPHY OF MUSIC

(Publication No. 4211)

Edward Arthur Lippman, Ph.D.
Columbia University, 1952

Part I of the dissertation deals with the space in which music is performed. Musical sources are perceived objects, and they have various spatial relationships between themselves and with respect to the listener. To what extent do these relationships enter into music as it is conceived and experienced? To what extent is the listener a perceiver of objects? The investigation begins with an examination of auditory perception, seeking to determine its characteristics and its nature, and how it is different indoors from outdoors. The application of this analysis to music seems to be quite fruitful in explaining many aspects of musical style and structure. The perception of instruments as objects undoubtedly enters into the musical experience, and the environment and placement of performers appear to have exercised fundamental and lasting influences upon the constitution of music and upon musical style.

Part 2 of the dissertation deals with the problem of whether music is spatial in some other way than the acoustic one. Is music inherently spatial apart from the fact that it takes place in the space of our everyday experience? Does it possess some kind of special spatiality? An analysis of the concept of space forms the groundwork of this part of the study. Then the supposedly spatial characteristics of music are taken up in turn, proceeding from pitch and volume to distance and motion and rhythm. We find (in addition to the fact that music is spatial as we ordinarily understand the term) that we have in music a richly elaborate spatial play without

external reference - an intricate fabrication whose nature can with justice be termed intrinsically spatial.

Part 3 of the dissertation deals with the relations of music to other spatial manifestations. How is music related to visual art, and to the conception of space formulated by physical science? Here, we have doubtless a multiplicity of answers, rather than a single solution. There can be no one key to the cultural interrelationships of music. The basis is to an extent found both in the acoustic attributes of music, in the characteristics dependent upon the space of performance, and also in the intrinsically spatial nature of music itself. But there are relations of music to visual art which appear to have a synesthetic foundation - a foundation, that is, in the interrelation of the senses; there are those which are grounded in the dance, a direct link between visual and auditory art. Music can also be related to spatial ideas by an out-and-out symbolic representation; and it is also related to them in the astonishingly pervasive doctrine of cosmic harmony. But perhaps the most general link between music and spatial conceptions is to be found in the structural complexity of music, which permits various formal and expressive identities to come into being between music and other products of human intelligence.

Microfilm copy of complete manuscript of 424 pages, \$5.30. Enlargements 6" x 8", 10¢ per page.

**THIRTY-SIX SELECTED CHORAL WORKS
OF THE SIXTEENTH CENTURY ADAPTED
AND ANNOTATED FOR PERFORMANCE BY
NON-PROFESSIONAL CHORAL GROUPS**

(Publication No. 4295)

William Stephan Mathis, Ph.D.
Florida State University, 1952

Performances of sixteenth century choral music are infrequent compared to those of music from the later periods. Today the music lives only through professional groups and recordings, and occasional performances of Palestrina and di Lasso by high school and amateur groups. The slight regard accorded sixteenth century choral music is due to several factors. There is a lack of coordination between the discoveries of the musicologists and the practical needs of the music educators. Much of the music available is in expensive editions and hence impractical for performance because of cost. Many of the editions still use archaic clefs. Material on style of performance is widely scattered and in editions too technical to be of value to any but experts.

This study is a collection of thirty-six editions representing nine different styles cultivated during the century. They are in modern clefs, with English translations, adapted for present day performing media. Along with each edition is an analysis

of the music with a brief essay on performance practices based on the most reliable findings of musicologists.

The thirty-six editions are designed to encourage and implement performance of sixteenth century choral music by high school and amateur groups. They contribute to an understanding of polyphonic writing, of its interpretation in performance, and of the development of homophonic choral writing. They are designed to stimulate an awareness of the variety and value of sixteenth century choral music, and a possible renaissance of its performance.

Microfilm copy of complete manuscript of 316 pages, \$3.95. Enlargements 6" x 8", 10¢ per page.

**SURVEY OF THE BASIC DOCTRINES OF VIOLIN
LEFT HAND TECHNIQUE (INCLUDING THE
POSITION OF THE BODY)**

(Publication No. 4225)

Frederick Charles Neumann, Ph.D.
Columbia University, 1952

The masters of the violin have always displayed a great diversity of playing style and technical approach. In the field of violin instruction this diversity has a counterpart in the multitude of methods or schools which exist side by side and are at variance with one another on nearly every question of technique. These schools have in common only the dogmatic conviction that each is in itself sufficient and superior. In consequence of such attitude every student is cast into an inflexible mold patterned by the rules of his school, and every student therefore must be recast whenever he changes teacher and method. The literature fully mirrors this chaotic state of affairs; every publication in the field is concerned solely with the exposition of a single set of precepts.

The present study is prompted by the conviction that such claims to exclusiveness are unjustified, that there is not only one valid approach to violin technique, that a great deal of the prevailing dogmatism is due to lack of familiarity with and understanding of the various doctrines and ideas, and that here, not uniquely, intolerance is bred of ignorance. It is this author's firm belief that a helpful contribution in the fight against narrow orthodoxy could obtain from making readily available in organized form the different ideas concerning violin technique, ideas garnered from a thorough study of the literature. This, then, is what the present study endeavors to do with regard to the technique of the left hand and the position of the body.

The introduction attempts to state reasons for the thesis that a unification of the theory of violin playing is possible of achievement only for a comparatively small area of the field and that for the most part various approaches will continue justifiably to be used side by side. Further the introduction offers explanation as to why the unavoidable corollary to dogmatism of methods - explicitly, a mechanistic

teaching procedure — is contrary to sound principles of instruction.

In the body of the study the field of enquiry is organized into topics which have to do with the various problems of left hand technique. (The position of the body is included because it has a close bearing on the technique of the left as well as of the right hand.) With regard to each of these topics the problem is first introduced (unless it is self-explanatory); the doctrines relating to the topic in the English, German and French literature are reviewed; the opposing views contrasted; the arguments examined objectively; and, finally, if results of such examination permit a brief evaluation is attempted. Almost always this evaluation bears out the thesis that definite preference can but rarely be established. The position of the body is dealt with first, and then the field of left hand technique is considered. In the latter, the doctrines divide naturally and are discussed as follows: those concerned with the static elements (position and holding of the instrument and basic attitudes of the left fingers, hand and arm); and those concerned with the dynamic elements (movements of the left fingers, hand and arm and the movement known as the vibrato).

The writer feels that he was helped in the assumption of an attitude of objectivity by the fact that he has had the good fortune of studying with eminent representatives of many different schools of violin playing and that he derived insight and a broader outlook from this experience.

Microfilm copy of complete manuscript of 306 pages, \$3.83. Enlargements 6" x 8", 10¢ per page.

SPEECH

A RHETORICAL ANALYSIS OF THOMAS ERSKINE'S COURTROOM DEFENSES IN CASES INVOLVING SEDITION LIBEL

(Publication No. 4042)

Merrill T. Baker, Ph.D.
State University of Iowa, 1952

This thesis investigates Thomas Erskine's courtroom defenses in cases involving seditious libel, which in late eighteenth century England was a highly controversial legal issue. Freedom of the press and free public discussion of government policy were at stake. Dissatisfaction with the conduct of the American Revolution in the 1770's, the failure of Parliamentary reform in the 1780's, and a fear that the French Revolution would spread in the 1790's led to increased use of seditious libel to legally silence public criticism.

Thomas Erskine, frequently called England's greatest pleader, was defense counsel in virtually all of the important libel actions. His defense of William Shipley laid bare outdated interpretations

placed on seditious libel by the courts. Shipley's case led directly to the Libel Act and eventually to legal re-interpretation, more consistent with British liberties. Erskine's basic premises toward seditious libel were announced in Shipley's defense. These premises became the heart of the Libel Act and the law during the next quarter century.

The factors above led this investigator to seek out the sources of Erskine's effectiveness as a legal speaker. Another factor was the fact that there has been relatively little investigation of forensic oratory. In spite of this, the writer believes that important problems affecting human relationships and basic freedoms arise and are solved through forensic oratory. One such problem centered in the seditious libel law.

Erskine's mind was clear as a bell when argument was framed. In Shipley's case, for example, he logically demonstrated that the interpretation being given the law was filled with inconsistent positions. He showed that the defendant could not plead the general issue, "not guilty," and be tried for the crime charged. He effectively brought constitutional principles to bear upon the law of seditious libel, showing that the interpretation was not consistent with the fundamental freedom of trial by jury. Erskine's logical argument was generally sound. Portions of it, in fact, were unanswerable. It did not, however, follow established legal precedents. He wanted and obtained a change in interpretation of the law.

He was effective through well balanced logical and emotional appeals, rather than through heavily emotional argument with little or no logical base. Erskine was sincere in his efforts. This quality of belief in a cause was not facility with emotions only. Erskine submerged himself in his clients defense to the extent that observers and later writers have credited him with an overriding ability to move men's emotions. This thesis demonstrates, it is hoped, the depth of Erskine's intellectual processes, though it must be admitted that he arrived at different conclusions concerning seditious libel than most of the legal minds of his time.

Though weak in legal background from his manner of education, Erskine skillfully combined logical, emotional and personal proofs to produce the desired result with his audiences. In Shipley's case, he probably obtained the best result possible in light of Justice Buller's instructions to the jury. After several appeals Shipley was freed.

Erskine combined a courteous manner with a gracious and kind attitude toward his fellows, while maintaining a forceful, animated and sincere delivery to achieve his effectiveness.

Microfilm copy of complete manuscript of 303 pages, \$3.79. Enlargements 6" x 8", 10¢ per page.

AN EVALUATION OF CLASSROOM SPEECH AND NOISE LEVELS IN TERMS OF SPEECH INTELLIGIBILITY IMPLICATIONS

(Publication No. 3609)

Jacob Brynes, Ph.D.
New York University, 1952

Problem

This study investigates speech and noise levels during certain elementary school sessions to derive criteria of value in planning for improved speech intelligibility, in evaluating teachers' speech and in estimating the hearing loss for classroom speech.

Speech and noise levels are measures of the energy of desired speech sounds and undesired sounds respectively. Speech intelligibility describes the efficiency of speech as a medium of communication as measurable by articulation testing. For such measurement, a speaker usually reads from syllable, word or sentence lists to a group of listeners; the percentage of items correctly recorded by the latter is called the articulation score and is accepted as a quantitative measure of the intelligibility of speech. Relationships previously found between speech levels, background noise levels and articulation scores are used as a basis for this research.

Research Design

A hundred and twenty sessions are studied acoustically using a time sampling technique and a sound level meter. These are regular meetings of 30 third, fifth and sixth grade classes equally distributed among ten schools; the three hours before lunch and the hour after lunch are used for measurement.

Analysis of Data

An analysis is made of the speaker behavior which compensates for increasing noise by louder speech; this tendency promises to remove noise threats to intelligibility. A condition of marginal intelligibility is evidenced for a ten decibel difference between the levels of speech and background noise; lower values are accompanied by frequent requests for repetitions.

A close relationship was previously found between articulation scores and the decibel difference between the levels of speech and background noise. Making several assumptions, the mean speech to noise ratios (defining such difference in level) of sessions are studied as indications of trends in speech intelligibility. The influence of certain class, schedule and school plant factors on these ratios is investigated by an analysis of ratio variance.

Conclusions and Recommendations

Although speakers compensate partially for louder noise by still louder speech, such compensation does not prevent a consistent decrease in intelligibility index as noise levels increase. Measures which promise to reduce noise levels will, therefore, also promise gains in the intelligibility of speech. Acoustic treatment of classrooms to reduce

reverberation time is not a feasible method for improving intelligibility under noise level conditions like those encountered.

The findings do not support efforts to improve intelligibility by smaller classes, shorter lessons or a preferential scheduling of speech-centered activities according to time of day.

Considering the grades studied, third grade classes have less to fear from external noise threats during morning hours. Fifth and sixth grade classes have more to gain by acoustic treatment, acoustic isolation or a preferential assignment of classrooms less vulnerable to noise from external sources.

The findings show an improvement in intelligibility for school designs using closed window and silent ventilating systems. Where group activities are used, furniture which enables grouping within a circle with a three foot diameter is advisable; the findings also imply groups small enough to perform within the same criterion in order to achieve an adequate intelligibility.

A speech level scale based on the classroom performances of thirty teachers is supplied as an aid to clinical testing. Such testing is described as a means for rating probable intelligibility in classrooms and for diagnosing the causes of low ratings.

A speech level of 67 decibels is recommended (if telephone receivers be used during articulation testing) to determine a "classroom adequacy index" for third grade pupils with subnormal hearing. Such index promises a valid measure of a pupil's hearing loss for classroom speech.

Microfilm copy of complete manuscript of 79 pages, \$1.00. Enlargements 6" x 8", 10¢ per page.

THE USE OF VISUAL AIDS IN THE TEACHING OF STAGE LIGHTING

(Publication No. 4058)

Walter Safford Dewey, Ph.D.
State University of Iowa, 1952

To find a means of increasing the teaching effectiveness in an undergraduate course in stage lighting, demonstrational devices were designed, to complement four one hour classroom lectures, each on a different sub-topic of optics. The sub-topics, refraction, reflection, light and shadow, and light and color, were chosen because of their fundamental importance in the course and because of the difficulty of student comprehension of facts in each of the sub-topics. After an examination of printed records of visual aids used in dramatic art and other associated fields, these devices and accessories, a black surfaced platform with a small volume light source, lens and reflector sections, a white cloth screen, a color demonstration board, a spectrophotometer, and others were built or assembled, with economy, flexibility in use, portability, simplicity, and ruggedness in mind.

Four lectures were composed, into which were

inserted notes on the specific uses for each of the devices and accessories. With the outline for each lecture was a list of item topics from which a ten question, multiple choice test could be constructed.

The test questions were written, tried on two previous classes in stage lighting, revised, and then assembled into four separate tests. The eight students registered in the course in the Spring of 1951, were separated into two groups of four. As each sub-topic was encountered, a lecture employing the aids devices was presented to one section and the lecture without the devices was presented to the other section. Following the two separately presented lectures, the pertinent test was given to the entire class on the next class day. Both the sections of the class and the days of aids presentation were alternated to lessen the effect of students' individual differences and the differences of time between lecture and test for the two groups.

From an analysis of both response choices and notes on classroom reactions of students, certain conclusions true of all lectures, tests, and devices, were reached. In addition, conclusions about needs for improvements in particular devices and lecture elements were reached. The significance of these conclusions, reached from concurring evidence in both test results and student reactions, is limited by the small number of students involved; the lack of a statistically sound sample has been admitted from the beginning, and there has never been the intent of eliminating the use of visual aids as the result of this study.

Within the limits stated, the conclusions are:

1. That there was no significant difference between the aids-taught sections and the other section, but that there was a distinct difference between sections due to difference in time for the two sections between lecture and test; 2. That test questions on practical situations were much more difficult to answer correctly; and 3. That four distinct contents needed more emphasis in lectures and improvements in the devices to demonstrate facts within those contents. The four contents were: effect of lens focal length, lamp position, and instrument opening, on beam spread angle and efficiency of instrument; the controlling factors in the formation of image and of shadow definition; the contributions of both color and surface to nature of reflection and degree of reflectivity; and the construction of, and use for spectral distribution curves.

Microfilm copy of complete manuscript of 195 pages, \$2.44. Enlargements 6" x 8", 10¢ per page.

A FACTORIAL ANALYSIS OF SPEECH PERCEPTION (Publication No. 4066)

Clair Norton Hanley, Ph.D.
State University of Iowa, 1952

Research in the area of speech perception has been concerned primarily with group responses on various auditory tasks. These responses have been

studied to; 1) evaluate the course of medical therapy, 2) determine the efficiency of transmission systems under varied auditory environments, 3) select individuals demonstrating attributes and abilities thought to be necessary in carrying out specific tasks, and 4) measure the benefit derived by the hearing aid user. The above list is not intended to be all-inclusive, but represents a few of the major areas of investigation intimately affiliated with speech perception.

This study was designed to investigate a portion of the domain of speech perception with regard to delineating consistencies or common sources of variance effecting the individuals responses to various speech materials. The technique of multiple factor analysis is eminently suited to a study of individual differences and hence was employed here.

One hundred and five students, sixty-two female and forty-three male, from the departments of Speech and Psychology at the State University of Iowa served as subjects. It was decided, that for an initial exploratory study only individuals with normal hearing would be used as subjects. Normal hearing was defined as an audiogram with a hearing loss no greater than ten decibels at any of the test frequencies of 500, 1000, 2000, or 4000 c.p.s.

Thirty-two recorded auditory tasks were given to the subjects in groups of seven. The tests were administered in a sound-isolated room which provided constant quiet listening conditions.

Pearson product-moment correlation coefficients were obtained for all possible pairs of tests using I.B.M. Tabulating equipment.

Six factors were obtained employing Thurstone's multiple group method and two additional factors were determined by the complete centroid technique. All possible pairs of factor loadings, representing the tests, were plotted and rotated by the radial rotation method until the resulting graphic configurations satisfied Thurstone's criteria of simple structure. The correlations between the factors (primary vectors) were calculated and they were used to aid in the interpretation of the eight factors.

The following is the tentative identification of the factors:

Factor A was termed a "Verbal Facility" factor and was defined by two related vocabulary tests.

Factor B was defined by Pure Tone Acuity and Speech Threshold tests and is called the "Threshold of Detectability for Tones" factor.

Factor C was determined by the tests of the Seashore Battery, hence it is designated as the "Seashore Battery" factor.

Factor D, "Voice Memory" factor is a specific memory factor.

Factor E was composed of distortion tests all employing similar test materials. This is called "Resistance to Distortion of Monosyllables" factor.

Factor F is termed the "Resistance to Masking of Harvard Sentences" factor and is similar to the 'E' factor as it is a resistance factor involving similar materials, in this case Harvard sentences.

Factor G was termed the "Unpleasantness" factor as all the tests showing loadings here contained

the one common element — unpleasantness.

Factor 'H', the "Synthesis" factor, is so-called because the tests making up this factor require the listener to piece together, at supra-threshold levels, fragments of speech and make a correct response.

Correlations between these factors indicate that at least two second-order factors may exist. These are to be found in the correlations between factors 'C', 'F' and 'H' and between 'E', 'F' and 'H'.

Theoretical and practical significance of the factors derived is discussed with implications for hearing testing and therapeutic techniques employed with speech defects.

Microfilm copy of complete manuscript of 90 pages, \$1.13. Enlargements 6" x 8", 10¢ per page.

**THE THEATRE IN THE FRONTIER CITIES
OF LEXINGTON, KENTUCKY AND
CINCINNATI, OHIO 1797-1835**

(Publication No. 4079)

Helen Langworthy, Ph.D.
State University of Iowa, 1952

The study treats of the factors which influenced the development of the theatre in the frontier cities of Lexington, Kentucky, and Cincinnati, Ohio, in the years 1797-1835. The procedure has been: First, to trace the story of the earliest theatrical performers in the region immediately west of the Alleghany Mountains which became the states of Kentucky and Ohio. Secondly, to record the activities of the amateur acting groups, the Thespian and Roscian Societies of Lexington and Cincinnati in the years 1799-1816. An attempt has been made to set this theatrical activity against a background of pioneer living and the evidences of the community's interest in other cultural pursuits, the libraries, newspapers, schools, lectures, and musicals. Thirdly, to compare the forty-five productions done by the amateur organizations in the two western towns with the plays performed in contemporary professional theatres in Philadelphia, Baltimore and New York. Fourth, to consider the contributions of professional actors and managers and local people to the establishment of the Kentucky Circuit. Fifth, to examine the factors which were important in the development of the professional theatres in Lexington and Cincinnati in the years 1810-1835. Sixth, to analyze and describe the types of plays which were most popular among the six hundred eighty-three recorded professional theatrical performances in the two towns between 1810-1835. Seventh, to describe the theatre buildings, their financing, management in the years outlined in the study. Eighth, to analyze the community attitude toward the theatre during the period. And finally, to recount the adventures of strolling players who visited the small towns adjacent to Lexington and Cincinnati in the years 1822-1835.

The term frontier which has been variously

defined as a "line, a region, or an idea," indicates for the purposes of this study, a place or region in the first years of its development.

The material upon which the dissertation is based was collected by the author from the advertisements and editorials on the theatre found in the newspapers of 1797-1835 in Lexington, Kentucky, and Cincinnati, Ohio. Manuscripts, Account Books, Trustees' Books, Scrap Books, Reminiscences of persons who had attended the theatre in the years 1797-1835; letters concerning the players whose descendants permitted the documents to be photostated and used; and letters from famous literary people to important local players formed other valuable sources of information. Descriptive accounts of the stage written by players, managers, and scene designers; statements of foreign visitors to Lexington and Cincinnati; and biographies of actors who played in the theatres of the two cities during the period, complete the sources upon which the study is based.

The study reveals that in a period of forty years the theatre in Lexington and Cincinnati had developed first from a purely amateur activity to one in which the strolling players combined their efforts with those of the amateurs to provide entertainment for the frontier community. Following this activity the Kentucky Circuit was established in which the theatres in the important towns of the state were opened for a short season each year. From this development Lexington and Cincinnati emerge as the two principal theatrical centers of the region in the years 1815-1835. At first Lexington had the greater reputation as a "theatre town;" but by 1835 changes in transportation, which accelerated the economic development of Ohio, reversed the importance of the two cities, and established Cincinnati as the "first city" of the western stage. This stage with its two hundred twenty-five productions in the years 1833-1834 must rank equally with the schools, newspapers, libraries, museums, lectures and concerts, as a factor in the community which enriched the cultural and social life of the people.

Microfilm copy of complete manuscript of 347 pages, \$4.34. Enlargements 6" x 8", 10¢ per page.

**THE NATURE OF THE CURSUS PATTERN IN
ENGLISH ORATORICAL PROSE AS STUDIED IN
FORTY-THREE CADENCES OF JOHN DONNE
AND THE COLLECTS**

(Publication No. 3987)

Frederick Sophus Sorrenson, Ph.D.
University of Michigan, 1928

The purpose of this study is to analyze the cursus pattern as it occurs in the English Prayer-book of 1549 and in the prose works of John Donne.

The investigation consisted of the analysis of forty-three cursus patterns for stress and of three cursus patterns for pitch. Assistance was given in the analysis of cadences by four university teachers

and a clergyman. The teachers were a teacher of phonetics, a teacher of rhetoric, and two teachers of English literature. Liddel's scale was used to record stress emphasis. Upon this scale, six degrees of stress are differentiated instead of the usual two. For a study of the pitch values, a modification of the Rousselot apparatus was employed. Each of the five cooperating readers and the investigator recorded thirty-three cadences on the Liddel scale. Three cadences were analyzed by means of the Rousselot apparatus. It is a fundamental principle of rhythmic activity that the movements are never repeated in exactly the same manner. In order to see how this principle operated when applied to cursus forms, the readers were asked to scan a number of passages twice, and to read two of them orally twice. One reader read a cadence three times.

When the Liddel scale was used in analyzing cursus forms the analysis indicated that they are primarily stress patterns. If in reading, one can isolate from time and pitch factors the element of stress, the apparent differences in reading disappear. The release of the rhythmic impulse sometimes occurred earlier in the sentence than at the beginning of the closing cadence. The first stressed syllable of a cursus pattern did not always receive more stress than any other syllable.

The records made with the Rousselot apparatus indicated that the cursus patterns contain rhythmic waves which form parts of a series of pitch waves running throughout the clauses and sentences studied. The pitch waves of the different readers varied widely in reading the same passages. The differences decreased, however, as the end of the sentence

approached. There was similarity evident, sometimes very close similarity, in the pitch waves when readers repeated the words forming closing cadences. The peak of pitch in a cursus pattern did not always fall upon the first stressed syllable of the cadence. It sometimes fell upon the second stressed syllable of a cursus. The peak of pitch in a cursus pattern sometimes fell upon one of the unaccented syllables of the design. The peak of pitch in a sentence containing a cursus pattern also fell upon some syllable which occurred earlier in the sentence than did the beginning of the conventional pattern. Examples were found of the peak of pitch occurring fourteen and fifteen syllables from the end of the sentence. At times, the pitch cursus patterns were distinct from the cursus stress patterns. When twelve pitch and stress records were compared, two sets of patterns were identical; in the other ten cases, the pitch cursus sometimes ran counter to the stress cursus, and sometimes the two were interwoven.

This investigation points toward the following conclusions: (1) The cursus forms are primarily stress patterns. The stress cursus is a definite, constant speech design which people have in mind when they speak of cursus patterns. (2) Pitch cursus also appear, which vary greatly, tending to be constant only when a speaker rereads a passage in which he produced a pitch cursus. (3) Existing rules for use in planning closing cadences need modification.

Microfilm copy of complete manuscript of 138 pages, \$1.73. Enlargements 6" x 8", 10¢ per page.

PHILOSOPHY

PHILOSOPHY

THE LOGICAL PART OF AL-GHAZĀLĪ'S MAQĀSID AL-FALĀSIFA, IN AN ANONYMOUS HEBREW TRANSLATION WITH THE HEBREW COMMENTARY OF MOSES OF NARBONNE, EDITED AND TRANSLATED WITH NOTES AND AN INTRODUCTION AND TRANSLATED INTO ENGLISH

(Publication No. 4166)

Gershon Baruch Chertoff, Ph.D.
Columbia University, 1952

This is a translation of the logical tractate, written in Arabic by al-Ghazālī, (d.1111) and translated into Hebrew by an anonymous translator to which Moses of Narbonne (d. 1362), wrote a commentary in Hebrew. The translation is preceded by an introduction, tracing in brief how the logic of Aristotle passed to the Arab and the Jewish philosophers and theologians, together with some account of the life and works of al-Ghazālī, in whom the Arab

tradition of Aristotelian logic reached its final form, and of his translator, Moses of Narbonne.

The logic follows the usual pattern of the Aristotelian tradition among the Arabs and deals with terms, predicables, propositions, syllogisms, their matter and form, and the qualities of the demonstrative syllogism.

The Hebrew text is based on three Hebrew manuscripts, with manuscript Aleph serving as the basic text and the other two manuscripts, as variants, and is further controlled by the Arabic version of the complete text as published in Cairo by the Sa'ada Press in 1912 (reprinted in 1936), and by a specimen of the Arabic version consisting of the preface and the first two chapters published by George Beer at Leiden in 1888.

The notes which follow the translation are for the most part explanatory of references and obscurities in the text and certain divergences between it and the Arabic text as published in Cairo.

Microfilm copy of complete manuscript of 408 pages, \$5.10. Enlargements 6" x 8", 10¢ per page.

AN ANALYSIS OF CERTAIN FORMS OF
NEGATION EMPLOYED IN THEORY
OF KNOWLEDGE

(Publication No. 4056)

Romane Lewis Clark, Ph.D.
State University of Iowa, 1952

The present essay is the record of the attempt to find and distinguish the several forms of negation actually employed in any philosophically adequate theory of knowledge. Thus, in ordinary speech we employ the negative to express such thoughts as "Salt is not sweet," and also "If he had been on time, we would have caught the train we missed." And it seems that any philosophically correct language or system must be able to catch and express the sense of these commonsense statements. But not only this, for it is part of the desire of the philosopher to be able to state not only what his system positively embraces but also what it excludes. The nominalist, for example, wishes to voice the denial "There are no universals," and to do so in a manner consistent with his other philosophical utterances.

Broadly dividing our labors along the lines indicated by these three types of negatives, we have called the first "empirical-nots", the second "counter-factuals", and the third "philosophical-nots".

In conducting our analysis of these forms of negation we have assumed that there is a basic difference between the sort of reference involved in the employment of names and that peculiar to indicative statements. Borrowing from a rather widely accepted tradition, we have insisted that names, as such, require some entity designated. Sentences, in virtue of their dual true-false character, do not refer in this fashion.

On the basis of this distinction, we were led to ask the following question: If a true sentence can be said to "map" a state of affairs, although it does not name it, what does a false sentence "map"? And, thus, how is it that the denial sign '-' can make a false sentence true? This treatment of negation as essentially a problem of reference provided the ground on which a purely syntactical account of the negative was rejected. Two alternative ways of expressing the sense of "empirical-nots" were examined. The one was based upon a notion of incompatibility between positive states of affairs; the other embraced negation as the reflection of an "exemplificational tie" — as fundamental as and on a par with, the 'is' of predication.

The consideration of "counter-factuals" attempted to establish that there are, in the subjunctive conditional contrary-to-fact, no new problems raised concerning negation that were not already apparent in "empirical nots".

The essay concludes with an examination of "philosophical-nots" and the suggestion that they involve for their complete expression an intimate mutual dependency between formal and commonsensical discourse.

Microfilm copy of complete manuscript of 229 pages, \$2.86. Enlargements 6" x 8", 10¢ per page

IMPRESSIONS OF JESUS REPORTED BY
GROUPS OF PROTESTANT CHILDREN THROUGH
GRAPHIC, ORAL AND WRITTEN EXPRESSIONS
OF JUNIOR-AGE CHILDREN, THEIR PARENTS
AND TEACHERS

(Publication No. 4175)

Sarah Dunning, Ph.D.
Columbia University, 1952

I. The Aim of the Study

To discover the associations and mental pictures which Protestant children, aged eight through twelve years, have of Jesus, and to study in comparison with these impressions similar associations of their parents and teachers.

To gain answers to the key question "What about Jesus is so special that Christians study him so much, and make him the center of their faith?"

II. Methods and Techniques of the Study

A. The two groups chosen for the testing:

Group A, consisting of 77 children and 20 adults (parents and teachers) in one church, tested personally by the author.

Group B, consisting of 181 children and 63 adults (all teachers, though some were parents) in churches of twelve denominations, in which the children were tested by their teachers and the teachers were tested personally by the author.

B. The four types of testing methods:

The Graphic Test, in which children of both groups depicted in terms of Jesus' deeds whatever qualities they judged to be distinctive in his nature.

The Oral Test, in which children of Group A explained to the author the meaning of their drawings, and made additional comments about Jesus.

The Written Test, in which children and adults of both groups wrote their answers to the key question cited above.

The Check List, in which children and adults of both groups checked positively or negatively teachings or events in Jesus' life as regards their importance to those tested.

III. Analysis of Findings

Associations with Jesus receiving highest rating on each test:

<u>Among Children</u>					
<u>Rank</u>	<u>Graphic Test</u>	<u>Oral Test</u>	<u>Written Test</u>	<u>Positive Checks</u>	<u>Negative Checks</u>
First	Crucifixion	Giving help	Crucifixion	Loving all	Repentance
Second	Healing	Healing	Healing	Healing	Temptation
Third	Preaching	Crucifixion As Savior	Giving help	Forgiving	Birth
<u>Among Adults</u>					
First			Son of God	Forgiving	Of special descent
Second			Loving all	Preaching	Performing miracles
Third			Best human	Resurrection	Fulfillment of prophecy

IV. Suggestions for the Use of Findings by Teachers

Since children and adults seem to agree more in positive than negative responses, a bond of understanding could exist as a basis for discussion of religious themes at home and in class.

Since disagreements between children and adults seem to be largely about topics pertaining to experiences that differ with age-level, deeper sharing of basic experiences might be the approach to a greater mutual understanding of religious ideas.

Since to both adults and children Jesus seems to be more of a contemporary resource than as a dated historical figure, enrichment of this functional role might be achieved through more accurate historical study, to show Jesus as a real person.

Since the gentle, compassionate aspects of Jesus appear to be more popular than his sterner qualities of judgment and his call to repentance, a more balanced portrait of him might be restored in which these elements recorded in the Gospels are made manifest.

Since an over-all view of the findings presents very little uniformity of teaching, a responsibility is suggested for each church and teacher to clarify their portrait of Jesus, if children are to see in him the figure exalted by the Christian faith.

Microfilm copy of complete manuscript of 140 pages, \$1.75. Enlargements 6" x 8", 10¢ per page.

THE PRACTICAL PHILOSOPHIES OF JOHN DEWEY AND ELIJAH JORDAN

(Publication No. 3998)

Lawrence Lindley Haworth, Ph.D.
University of Illinois, 1952

As used in this thesis, the term 'practical philosophy' embraces 'metaphysics of society' and 'theory of legislation'. Metaphysics of society discovers the categorial schemes in terms of which society, its structures and its processes, is understood, criticizes those schemes and formulates categorial schemes in terms of which society ought to be understood. Theory of legislation formulates the social end(s) and the method(s) by which this end or these ends may be realized.

Social science inquiries presuppose categorial schemes. Metaphysics of society, in making these schemes explicit and in formulating adequate schemes, organizes social science. Social science inquiries, in turn, lend confirmation to metaphysics of society. Theory of legislation, in formulating the social end(s) and method(s) by which this end or these ends may be realized provides for the actualization of the potential significance of social science findings for legislation.

John Dewey and Elijah Jordan develop 'social' philosophies which are organizable as practical philosophies in the above sense. In metaphysics of society both focus attention on social institutions. Dewey's conception of emergent levels of existence appears in Jordan's thought as a series of forms of individuality. For Jordan, the outstanding forms of individuality are the human being, the institution, and the state. What Dewey characterizes as the increased corporateness of modern life is interpreted by Jordan as a transference of the will-life. For Jordan, any form of individuality may possess will

(capacity to realize ends) and institutions, today, are willing bodies par excellence.

In theory of legislation, Dewey's analysis of the increased corporateness of modern life gives rise to the conclusion that human intelligence is performing virtually no directive function. Jordan's conception of a transference of the will-life gives rise to the same conclusion. Both propose experimentation as the political method by which intelligence may become effective. The social end for Dewey is full communal life, and this roughly approximates the end as conceived by Jordan. For Dewey, the end is to be realized by the public as constituting a Great Community and as dedicated to a scientific method. For Jordan, the process by which the end may be realized is analysable into three functions: speculation, administration, and adjudication. Speculation is experimental manipulation of ideas (ideals and plans); administration is institutional activity as guided by the results of speculation; adjudication is the testing of the relation between ends realized by administration and the social end. The emphasis in Jordan's theory of legislation falls on designing institutions so that their organization is appropriate to the functioning desired of them.

Jordan's conception that all forms of individuality may possess will clashes with Dewey's refusal to postulate different types of actors. Two considerations are offered which indicate the superiority of Jordan's position in this connection. Both Jordan's and Dewey's theories of legislation are incomplete in that they do not develop hypotheses as to how a start may be made toward realizing successful social control. An argument is offered for the assertion that formulation of such hypotheses is a task of practical philosophy.

Microfilm copy of complete manuscript of 120 pages, \$1.50. Enlargements 6" x 8", 10¢ per page.

DEWEY'S LOGICAL THEORY: SOME CLARIFICATIONS AND CRITICISMS

(Publication No. 4228)

John Joseph O'Connor, Ph.D.
Columbia University, 1952

The discussion is of a number of central ideas in *Logic: The Theory of Inquiry*.

Determining a problem involves not just observing facts but also formulating a question. Possible solutions, as answers to that question, are usually not just forecasts of results of organism-environment interactions. Many passages from Dewey suggest that he does not really mean that solutions are only such forecasts; perhaps he was led to statements that they are by failing to distinguish possible solution as possible method of conducting the inquiry and by a desire to emphasize the importance of organic activities in inquiry. Not all inquiries are hypotheticals - inductive; some establish answers by deducing them from observed facts. In some such

inquiries the possible solution only suggests, rather than implies, formulations of testing operations.

Dewey's definitions of "judgment", "subject", "predicate", "copula" merely give new language for repeating assertions of "judgment", "predicate", "copula" are somewhat confused.

Contrary to a possible meaning of some Deweyian statements, most objects exist independently of inquiries; at least Dewey offers no evidence in support of this, and there is prima facie evidence against it. Many passages suggest that the statements in question mean simply that the distinction between organism and environment is a distinction between things connected by experiencing.

Every inquiry "transforms" its situation by determining a significance of it, but not all inquiries need to physically change objects by experiment, and some do not even need sensing in the course of the inquiry.

Any scientific inquiry has the following characteristics (and not just historical inquiry of which Dewey explicitly asserts all of them): it is only concerned with selected facts; others, both knowable and actually known, are left as an unspecified background; new problems are occasioned for it by new ideas and needs which develop as culture changes; and consequently it has to discover new ways in order to determine new significances.

Perhaps Dewey means by "truth-falsity is not a property of propositions" that propositions being true (actually or potentially warrantably assertible) is not a sufficient nor even a necessary condition for then being efficacious in inquiry. But this true idea should be supplemented by the caution that for long run maximum efficiency in inquiry, propositions should not be conceived seriously in conflict with available evidence.

The functions propositions exercise in inquiry can perhaps not always explain their forms. And some of Dewey's specific statements about the functions of propositions of various forms appear incorrect.

Some of Dewey's assertions about kinds are incorrect. His theory of generic and universal propositions, so far as it is clear, contains nothing true save a few familiar ideas. Universal propositions do not all formulate operations, are not all definitions, and are not all necessary. Generic propositions may be definitions, needn't be probable, and do not imply the existence of singulars. General propositions may function in inquiry as neither generics nor universals. Arguments Dewey offers do not establish their conclusion that scientific concepts refer only to interconnections among things of common sense experience.

Dewey's description of induction of generalizations, so far as clear, adds nothing to his earlier description of hypotheticals - inductive inference. An unclear passage about the "definition" of induction may mean the true idea that in fields of established knowledge induction is more reliable because initial data signify, with greater probability of complete indication, which factors are likely to be relevant.

Laws do formulate "sequence or coexistences of events" in the sense that they formulate possible

sequences or coexistences of possible events of specified kinds.

Microfilm copy of complete manuscript of 285 pages, \$3.56. Enlargements 6" x 8", 10¢ per page.

FORM AND CONTENT IN THEORY OF KNOWLEDGE SINCE KANT

(Publication No. 4098)

Leonard Orville Pinsky, Ph.D.
State University of Iowa, 1952

In this essay I have attempted to analyze the major historical variants of the dichotomization of knowledge into form and content since Kant. In the analysis I find that there are three major approaches within this Kantian tradition. The first occurs in the writings of Kant and those who have been called neo-Kantians. In general, this group of what I have termed Critical theorists have maintained that knowledge is constituted of both formal and material features, both being necessary and significant for a philosophical reconstruction of the universe. The formal features, for them, are asserted to be contributed to experience and knowledge by the activity of an ego, transcendental or otherwise; the material features are a result of some reality which underlies experience, and are those features of experience which impinge themselves upon a subject independently of any act of the ego.

The second approach has been by those I have termed Empirical theorists. In general, the empirical theorists maintained that there is no formal constituent in experience or knowledge. Rather, what the Critical theorists considered formal are, by the Empirical theorists, considered to be merely matters of fact.

The third approach has been what I have called the Syntactical view. The Syntactical theorists assert that there are formal as well as material features in the language which expresses what we know. However, these are, for them, features of language, and not of either experience, knowledge, or the ego.

In the course of the analysis I have shown that none of these three major attempts to either maintain or reject the dichotomy have been successful; in general, either the theorists have failed to establish the dichotomy convincingly or their accounts engender problems which are unresolved in their own writings.

In conclusion, I have briefly examined two contemporary discussions of the most recent variant of the form/content issue. While they disagree on whether there is an epistemologically significant dichotomy in knowledge, these analysts do agree that the problem can best be solved by using the methods of linguistic analysis. At the same time, they explicitly recognize that the results thus obtained, if of philosophical significance, are not merely linguistic.

Microfilm copy of complete manuscript of 181 pages, \$2.26. Enlargements 6" x 8", 10¢ per page.

THE CONCEPT OF EXISTENCE IN KIERKEGAARD AND HEIDEGGER

(Publication No. 4239)

Maria Margareta Stavrides, Ph.D.
Columbia University, 1952

The dissertation, "The Concept of Existence in Kierkegaard and Heidegger" is a detailed analysis of Heidegger's thought showing its relationship to Kierkegaard's philosophy. Kierkegaard's existential dialectic grew out of his opposition to Hegelian dialectic and is a criticism of all thought given to metaphysics and ontology. Although Heidegger's existential thought was inspired by Kierkegaard's philosophy and is in his spirit, it goes beyond the sphere of existence in order to find the meaning of being.

The first part of the dissertation deals with the concept of existence as presented by Kierkegaard in his philosophical writings. These are shown to be the source of the problems with which Heidegger deals although from the point of view of method the two thinkers have nothing in common. While Kierkegaard is the artist philosopher making use of imagery, myth and "indirect communication", Heidegger's thought is the result of a phenomenological analysis of human existence which he calls "Dasein". Another basic difference between Kierkegaard and Heidegger is shown to lie in the importance of the concept of existence itself. For Kierkegaard existence is the very substance of philosophy, for Heidegger the phenomenological analysis of it is merely a transition or stepping stone towards his concept of being.

The second part of the dissertation presents Heidegger's concept of existence in its relation to his philosophy as a whole. The attempt is made to show why Heidegger's ontology is a departure from traditional metaphysics. Heidegger's concept of "Being-in-the-world" and "worldliness" are used in support of this thesis (chapters II and III). Chapters IV, V, VI, and VII deal with the various modes of being of "Dasein" and it is mainly here that the main Kierkegaardian themes find their phenomenological treatment.

Chapters VIII and IX are concerned with the ontological ground of Dasein which Heidegger finds to be temporality.

The dissertation also clarifies the connection between Heidegger's earlier and later work showing the latter to be a further development of his "turn" away from traditional metaphysics and as such to be a confirmation of his earlier intention rather than a break from it as most of his interpreters have assumed. Heidegger's work is to be taken as an ontology and not as a philosophy of "Existenz".

Microfilm copy of complete manuscript of 205 pages, \$2.56. Enlargements 6" x 8", 10¢ per page.

A HISTORY OF SCOTTISH EMPIRICISM FROM 1730 to 1856

(Publication No. 4240)

Sten Harold Stenson, Ph.D.
Columbia University, 1952

The history of Scottish empiricism from 1730 to 1856 is the story of a philosophical movement which attempted to correct the over-narrow description of experience and sensation developed by Locke and Berkeley from certain Cartesian assumptions concerning perception — the preconceptions of experience and sensation which led to Hume's confusion, in the *Treatise*, between "reason" and "common sense." It is also the story of an attempt to replace Locke's rationalistic moral philosophy and theology with a religious and moral philosophy that would be founded squarely on experience and be consistent with the over-all principles and procedure of a radical empiricism. By applying the method (observation and induction) of "Baconian philosophy," the authors of this tradition arrived at conclusions and problems which are valuably relevant to the opinions of contemporary humanists, empiricists, positivists, ethical realists, and their critics.

The history of this movement is particularly instructive to us today because it did not successfully complete the job it set out to accomplish. Despite its analysis of experience — often a brilliant analysis — and, despite its many provocative and lasting contributions to the development of empirical philosophy, this Scottish philosophical tradition was eventually all but lost in the general Scottish acclaim of absolute idealism in the late 19th century. The common sense account of perception stumbled deep into contradictions, adopted a form of Kantian phenomenalism in the writings of Sir William Hamilton and finally, with Ferrier and Mansel, ceased its common sense realism altogether.

This process from common sense realism to rationalistic idealism is illustrated in the Scottish psychological considerations of this period. Describing human nature (the basis of their theory of perception and all their other convictions), these empiricists developed Francis Hutcheson's affectional psychology but vacillated between a kind of common sense faculty psychology and an association psychology until Hamilton abandoned this merely descriptive science of human nature and adopted Kant's method of the transcendental analytic and a more intellectualistic description of the human mind.

In religious philosophy we witness again this movement from common sense to rationalism. These Scottish authors led a revolt against Calvin orthodoxy and rational theology by attempting to defend a God-hypothesis on the basis of man's passionate demands. The argument from design was more and more based upon biological design, man's moral affections, and upon the present operation and obvious need of final causes in human society. Such a natural theology increasingly described a God whose character was a principle of "natural progress."

However, Scottish authors too often confused their "natural principles of belief" with intuitions of absolute truth. Orthodox divines converted these common sense principles into intellectual faculties of intuition; a Presbyterian reaction reasserted the Old Truth in pulpit and lecture hall.

Moral and aesthetic philosophy followed a similar course: a rise and fall of radical empiricism. Values described as "real" and "natural," although always relative to human nature, were eventually transformed into absolutes by a clergy who zealously guarded the Absolute Truth, and by Scottish Hegelians who became heir to Hamilton's Kantian adaptation of the "principles of belief."

Nevertheless, in spite of its difficulties in all areas, and in spite of its partial eclipse in the late 19th century, this tradition remained uniformly optimistic concerning the solution of man's problems. Amidst all their contradictions and self-criticism one conviction was never gainsayed: from first to last these authors pronounced their faith in man's ability to help himself. Granted the most complete freedom compatible with civil society men, they concluded, can realize a continuous progress.

Microfilm copy of complete manuscript of 335 pages, \$4.19. Enlargements 6" x 8", 10¢ per page.

CRITICISM AND ESTHETICS

(Publication No. 4111)

Thomas Henry Thompson, Ph.D.
State University of Iowa, 1952

The aim of this essay is two-fold: to investigate the problem of the function of the art-critic and the function of the esthetician. It is argued that common-sense beliefs about art provide a basis against which theories seeking to resolve these problems can be "tested" for adequacy. Those whose implications clash with ordinary convictions are suspect as proper systematic reflections of everyday ways of thought and language usage.

Among the theories of art criticism that are critically surveyed is the position that criticism itself is an art form. This alternative is found to lead to difficulties in that we do not ordinarily speak of art as being "about" its subject-matter in a sense analogous to that in which it is admitted that (verbalized) criticism is "about" works of art. Another possibility is that the critic speaks about the intention of the artist. This is unacceptable since commonsense and criticism mean to refer to (physical) art objects themselves when judging esthetically, not to mental states of artists. That criticism is an empirical science is highly misleading, e.g., in that the critical judgment (though in some sense "complex") is not complex in the manner of scientific theory. The critical judgment is a singular valiative, not a generalized prediction of matter of fact. These considerations lead to the positive suggestion that what the critic properly does is to compare the esthetic values of specific

expressions in terms of the "rightness" of that expression in view of the artist's emotion.

The function of the esthetician (in analogy with that of the axiological ethicist) is conceived as a study of the nature of esthetic value itself (in contradistinction, e.g., to the specific valuations of the art-critic). It falls within his sphere to differentiate kinds of value (e.g., moral *versus* esthetic), specify the status of the esthetic object, contrast and compare the areas of fact and value, and have a place within his system for theory of criticism.

Various positions in esthetic theory are examined, first with respect to their intrinsic merit as commonsensically adequate analyses, and secondly as illustrations of the function of the esthetician. In this manner the writings of the neoplastic artist, Piet Mondrian, the linguistic theories of Charles Morris, W. B. Gallie, and E. W. Hall are expounded and critically discussed. A running emphasis, throughout both chapters, is the denial that the esthetic object itself can be interpreted as a symbol or sentence.

Microfilm copy of complete manuscript of 350 pages, \$4.38. Enlargements 6" x 8", 10¢ per page.

FOUR TREATISES BY 'ISĀ IBN ZUR'Ā, TENTH CENTURY JACOBITE CHRISTIAN OF BAGHDAD

(Publication No. 4243)

Herbert Fergus Thomson, Jr., Ph.D.
Columbia University, 1952

This dissertation includes an English translation of four theological treatises by the Jacobite Christian theologian, philosopher, and translator of Baghdad, Abū 'Alī 'Isā ibn Zur'ā (d. 1008 AD), a student of Yaḥyā ibn 'Adī. The author of these treatises was one of the translators of the Aristotelian corpus from Syriac into Arabic, and is better known for his work as a translator than as a theologian. The Arabic on which this English translation is based is the edition by Rev. Paul Sbath from three manuscript sources, published in the work entitled *Vingt Traités philosophiques et apologetiques d'Auteurs arabes chrétiens du IX au XIV siècle*. Cairo: H. Friedrich & Co., 1919, pp. 6-75.

Little study has been made of the works of the Arabic Christian writers, beyond the cataloguing of existing manuscripts in a work by Georg Graf, entitled *Geschichte der Christlichen Arabischen Literatur*, Vatican City Library, 1947. In 1920 a work was published by Augustin Périer by the title of *Yaḥyā ben 'Adī*, along with two supplementary volumes containing translations of his works. These have formed the basis for our study of Ibn 'Adī's student, Ibn Zur'ā. In connection with this research it has also been possible to make some critical appraisals of the conclusions reached by Graf and Périer in their studies on Ibn 'Adī.

The above-mentioned works have been based almost entirely on Christian sources. Since the

publication of these works, two recently edited compositions by Abū Ḥayyān at-Tauhīdī have provided further knowledge concerning the Muslim environment of Ibn 'Adī and Ibn Zur'ā. These works describe the proceedings of the famous Sijistānī Society, of which Ibn Zur'ā and Ibn 'Adī were prominent members. Such friendly association of Christian theological writers with Muslims, Jews, and Christians of other sects had been unprecedented during the period of Muslim rule, with the single exception of the activity of St. John of Damascus in the Umayyad court at Damascus. But we have no knowledge through Muslim sources even of John of Damascus, so that the material found in the works of Tauhīdī is in a sense unique.

Treatise I of the four that are translated into English contains proof for the existence of God, an exposition of the Christian doctrine of the Trinity according to certain analogies that had also been used by Ibn 'Adī. This work shows dependence on the writings of the Cappadocian Fathers and of pseudo-Dionysius the Areopagite. Treatise II is a defense of the Christian doctrines against criticisms raised by the Jewish theologian, Bishr ibn Finahās, and by Daūd ibn Mūshaj. The section on Christology that is found in this treatise presents a position that is scarcely distinguishable from Nestorianism. Treatise III is a defense of Christian doctrine against the objections expressed by the Mu'tazilite Muslim, Abū'l-Qasim al-Balkhī, in his book *Awa'il al Adilla*, and by al-Iskafī. Treatise IV, which claims to have been inspired by the spirit of his late teacher, Ibn 'Adī, provides a metaphysical basis for the Christian doctrine of the Trinity.

The three introductory chapters to the English translation of Ibn Zur'ā's works include: Chapter I, a background study of the development of the Jacobite Church, of the main themes of Christian apologetic writing under the rule of Islam, and the growth of philosophy in Islam under the stimulus of Arabic translations of the Greek philosophical works. Chapter II, a biography of Ibn Zur'ā, which describes his work as a translator, philosopher, theologian, physician, merchant, and active member of Baghdad society. Chapter III, a theological commentary on the four treatises, which undertakes to analyze and classify the doctrines that are presented.

Microfilm copy of complete manuscript of 311 pages, \$3.89. Enlargements 6" x 8", 10¢ per page.

DENIS DIDEROT AND LUDWIG FEUERBACH: STUDIES IN THE DEVELOPMENT OF MATERIALIST MONISM

(Publication No. 4250)

Marx William Wartofsky, Ph.D.
Columbia University, 1952

Denis Diderot and Ludwig Feuerbach are taken up, in two connected studies, in terms of their development of a materialist philosophy. Diderot, as a leading figure among the "philosophes" in eighteenth-century

France, develops a materialist position in terms of positing one material substance in the universe, outside of which nothing else exists. The relation of Spinoza's monism and Leibniz's monadology to Diderot's materialist monism is discussed, and the materialization of the monad, from an ideal element to the elementary particle of matter, in Maupertuis is seen as one of the links between Leibniz and Diderot. Diderot's roots in the mechanical materialism of D'Holbach and LaMettrie are discussed, particularly in relation to the question of motion and change in matter, and the effect of Leibniz's concept of self-motion and inherent force upon this mechanical materialism is taken up. The question of the evolution of matter, from inorganic to organic, and from one biological species to another is discussed, as are Diderot's pre-Lamarckian views on evolution and his concepts of continuity, contiguity and the nature of aggregates of molecules. The origin of living, organic, and sensible matter is the subject of a study of Diderot's concept of qualitative change in matter, as a result of its organization, and constant motion, and the relation of Diderot's thought to vitalist and mechanist concepts of the origin of life, and of consciousness is discussed. Diderot's Epistemological thought, particularly as expressed in *D'Alembert's Dream*, is seen to be based on the concept of the common materiality of consciousness and matter, and the unity of object, sensation and idea. Diderot's discussion of the role of abstraction, in consciousness is taken up, as it derives from his materialist epistemology.

Feuerbach, as one of the left-Hegelians who carried on a critique of Hegel's idealism is seen to stem directly from the tradition of German idealism, and immanentism; from Boehme through Schelling and Hegel. His early idealism, and its expression in his attempt to formulate a phenomenology of human consciousness on the pattern set by Hegel, is

discussed. He posits consciousness as infinite in its nature, and as a negation of individuality, which is delineated by sensation. His studies of Spinoza and Leibniz are taken up, in their effect on the development of his own monism. His critique of Hegelism, reveals the paradox between its positing of an Absolute as the beginning and end of this dialectic. This circularity is seen as a contradiction of the very dialectic itself, and Feuerbach sees Hegelianism therefore as conditional and limited by its own time and development. In his critique of the foundations of religious thought, Feuerbach develops Hegel's theory of the self alienation of Idea, in materialist terms, and sees in his study of Christianity, all religious concepts as projections and embodiments of human consciousness self-alienating itself and setting itself up as an object outside of itself. Man is thus seen to be adoring his own nature, and all the divine attributes are "nothing but" the attributes of human nature thus projected.

Feuerbach develops, with Diderot, the concept of the common materiality of consciousness and the external world, and falls back upon the Sensationalism of Moleschott, to show the unity of thinking and being. Moleschott's physiological determinism is expressed by Feuerbach in the famous aphorism, "Man is what he eats". Feuerbach sees the Natural Sciences as teachers of equalitarianism and communism to man. The materialist epistemology that Feuerbach develops is based on the unity of sense and its object, and his earlier idealist concept of consciousness is put into materialist terms to state that consciousness is a refined form of sensibility. He posits the Theory of knowledge as the true subject of philosophy, and sees the history of philosophy as the struggle between materialism and idealism.

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PHYSICAL SCIENCES

ASTRONOMY

A STUDY OF ERRORS IN VISUAL METHODS OF MEASUREMENT OF THE VELOCITIES OF METEORS

(Publication No. 4062)

Joseph Foster Foster, Jr., Ph.D.
State University of Iowa, 1952

Since recent results on meteor velocities throw doubt on the authenticity of hyperbolic meteor or-

bits, it seems desirable to re-investigate the results of the Arizona Expedition for Research on Meteors. This expedition and similar observations by Öpik at Tartu, are the only important meteor investigations giving a high percentage of hyperbolic velocities, for which the high velocities have not been shown to be spurious. For this reason, internal evidence of their accuracy or inaccuracy is sought.

Since only tangential velocities were observed, true velocities and radiants are known only for the shower meteors. The present investigation consists, primarily, of a comparison of sporadic and

shower meteor velocities, and of a check on the accuracy of the velocity observations of the shower meteors.

It is found that the average tangential geocentric velocities of the sporadic and shower meteors are almost exactly the same, while the average tangential heliocentric velocity of the sporadic meteors is greater than that of the shower meteors, but slightly less than that of the Leonids. This would indicate that more of the sporadic meteors are moving in direct orbits than is the case for the shower meteors. A check on the directions of motion of the meteors bears this out. This motion, together with the similarity of velocity of the sporadic and shower meteors, definitely indicates membership in the solar system, and elliptical rather than hyperbolic velocities.

Since the radiants and true velocities of the shower meteors are known, the velocity with which they should have been observed could be computed. When this was done it was found that the observed velocities were, on the average, approximately ten kilometers per second too large. It was also seen that, even with this correction applied, any individual velocity is unreliable. The correlation between observed and computed velocities is only fair for all the shower meteors, while for individual showers it is practically non-existent.

Further investigation of members of the Leonid and Geminid showers was made in an effort to find where the velocity errors were introduced. A correlation was found indicating that for meteors of short duration the observed velocity is too great. There is also some indication that bright meteors are observed as moving faster than faint ones for comparable true velocities.

The study indicates, therefore, that the hyperbolic velocities obtained by Öpik and the Arizona Meteor Expedition are spurious. The errors probably result from the difficult and inaccurate "rocking mirror" method of observation, and from a tendency to observe meteors of short duration and great brightness as moving faster than they really do move.

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CHEMISTRY

THE EFFECT OF HYPERCONJUGATION IN THE BECKMANN REARRANGEMENT OF ACETOPHENONE OXIMES

(Publication No. 3969)

James Fletcher Baxter, Ph.D.
Vanderbilt University, 1952

In saturated organic compounds the order of electron release of alkyl groups is tertiary alkyl > secondary alkyl > primary alkyl > H. In certain reactions in which the alkyl groups are adjacent to unsaturated bonds or centers of reaction the order of electron release has been observed to be the reverse of that above. This latter effect is variously referred to as alkyl conjugation, no-bond resonance, the Baker-Nathan effect, or hyperconjugation. Evidence for hyperconjugation has been presented from theoretical considerations, kinetic, equilibrium, electric moment, spectroscopic, and refractivity studies. Though a large amount of evidence favors the theory, there are cases of indecisive and even conflicting evidence. Even so, the hyperconjugation theory has become widely accepted and is very frequently used to explain otherwise anomalous chemical phenomena.

The problem in this investigation was to make a kinetic study of the Beckmann rearrangement of *p*-methylacetophenone and *p*-*t*-butylacetophenone oximes in 95% sulfuric acid and from the relative rates of reaction determine whether and to what extent hyperconjugation enters into such reactions. It was further hoped that these results could be correlated with those of other reactions in producing a more coherent picture with regard to electrophilic reactions in general. Apart from this problem, it was of interest to determine the rate of rearrangement of benzophenone oxime for comparison with that of acetophenone oxime to test the prediction that benzophenone oximes should arrange more rapidly than acetophenone oximes.

Initially, the ultraviolet absorption spectra of *p*-methylacetophenone and *p*-*t*-butylacetophenone were determined in iso-octane. The strong absorption band, characteristic of α, β unsaturated ketones, was shifted toward the visible by about 1 millimicron in the case of *p*-*t*-butylacetophenone with respect to that of *p*-methylacetophenone. The relative positions of the bands were the reverse of that predicted by the hyperconjugation theory.

The rates of rearrangement were first measured by following the rearrangement in the absorption cells of the Beckman spectrophotometer. More precise results were obtained by hydrolysis of the remaining oxime to the ketone and simultaneous precipitation of the ketone as the insoluble 2,4-dinitrophenylhydrazone, after which the precipitate was filtered and washed to constant weight. By this method the specific rate constants of *p*-methylacetophenone and *p*-*t*-butylacetophenone oximes were determined at 40.9, 50.9, and 60.9 degrees in 95.4% sulfuric acid at a concentration of 0.52 mole/liter; those of benzophenone oxime at 30.9, 40.9, and 50.9

degrees; those of acetophenone and *p*-chloroacetophenone at 50.9 and 60.9 degrees under the same conditions. The first order rate constants in reciprocal minutes $\times 10^3$ and the activation energies in kilocalories are: *p*-methylacetophenone 0.569, 2.101, 7.20 (E_A 26.38); *p*-*t*-butylacetophenone 0.547, 2.012, 6.88 (E_A 26.31); benzophenone 0.500, 1.934, 6.63 (E_A 25.31); acetophenone 1.127, 3.950 (E_A 26.99); *p*-chloroacetophenone 0.714, 2.552 (E_A 27.41).

In every instance the rearrangement rate of *p*-methylacetophenone oxime was 4 to 5% greater than that of *p*-*t*-butylacetophenone oxime. The difference is significant in terms of the precision of the method and lends support to the hyperconjugation theory.

When Hammett's sigma values were plotted versus the logs of the above rate constants a straight line was not obtained as is true of certain other electrophilic reactions. From the above rates modified sigma (σ_e) values were tentatively assigned to *p*-methyl and *p*-chloro substituents to apply when these groups are involved in electrophilic reactions in which electromerism is expected to be important in the rate determining steps. These values have been applied with good success to the rearrangements of benzophenone oxime picryl ethers and with fair success to the hydrolysis of benzhydryl chlorides and to substitution in the benzene ring.

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KINETICS, STATISTICAL THERMODYNAMICS AND MECHANICS OF REVERSIBLY ASSOCIATING POLYMERIC MEDIA

(Publication No. 4263)

Paul J. Blatz, Ph.D.
Princeton University, 1949

Abstract not available.

Microfilm copy of complete manuscript of 100 pages, \$1.25. Enlargements 6" x 8", 10¢ per page.

A POLAROGRAPHIC STUDY OF SUBSTITUTED BENZOPHENONES AND DERIVATIVES: THE EFFECT OF SUBSTITUENTS ON THE HALF-WAVE REDUCTION POTENTIALS

(Publication No. 3970)

Robert Wallace Brockman, Ph.D.
Vanderbilt University, 1952

It is the purpose of this study to determine whether or not, and to what extent, substituents in

the *meta* and *para* positions of the parent compound, benzophenone, and certain derivatives of benzophenone such as semicarbazones and oximes, influence the half-wave reduction potential of the carbonyl group or its derivative group.

Although the literature on polarography of organic compounds is voluminous, it is difficult to compare quantitatively the results obtained by different investigators since identical conditions do not obtain. The variables, such as pH, buffer system, supporting electrolyte, ionic strength, and solvent, unless held constant, serve as a barrier to any consistent compilation or comparison of the data of the older literature on the subject. This study was begun with the view that the results of a comparison of the half-wave potentials of a related series of compounds under essentially identical conditions would be a useful addition to the body of organic polarographic literature.

The ketones which were synthesized and/or purified and their half-wave reduction potentials (in volts) follow: benzophenone (-1.140); 4-methylbenzophenone (-1.165); 4-*t*-butylbenzophenone (-1.166); 4,4'-dimethylbenzophenone (-1.187); 4-chlorobenzophenone (-1.093); 4,4'-dichlorobenzophenone (-1.002); 4-chloro-4'-methylbenzophenone (-1.102); 4-methoxybenzophenone (-1.195); 4,4'-dimethoxybenzophenone (-1.26); 4-bromobenzophenone (-1.046); 3-bromobenzophenone (-1.021); 3,3'-dibromobenzophenone (-0.913); and 4-aminobenzophenone (-1.161). The following semicarbazones were available¹ for polarographic analysis: benzophenone semicarbazone (1.104); α - (-1.114) and β -4-methoxybenzophenone semicarbazone (-1.116); and α - (-1.048) and β -4-bromobenzophenone semicarbazone (-1.050). Benzophenone oxime (-0.983) was prepared; and the α - (-0.973) and β -4-methoxybenzophenone oxime (-0.977) and α - (-0.930) and β -4-bromobenzophenone oxime (-0.937) were available from preparations by Professor Pearson.

The polarograph used throughout this study was a modified Fisher Scientific Company "Electropode." The potentials applied to the dropping mercury electrode assembly were measured to the nearest millivolt by means of an external potentiometer. Mercury pool potentials with respect to a 3.5 Normal calomel half-cell were measured with this potentiometer.

The composition of the solutions for polarographic analysis was 0.1 molar potassium chloride, 0.1 molar sodium acetate - acetic acid buffer, 10^{-3} or 10^{-4} molar reducible organic component depending on its solubility, 0.02 grams of gelatin, and 40 milliliters methanol per 100 milliliters solution. The pH of such a solution was 5.20, and the ionic strength and buffer capacity of all solutions were constant.

Typical sigmoid flexures were obtained by plotting the potential in volts *versus* the current in microamperes. These curves were analyzed to determine the half-wave potentials and the number of electrons transferred in the reduction process. Other workers^{2,3} have shown that the reduction of benzophenone in acid media involves the reaction of

one hydrogen ion for each molecule of benzophenone reduced. This study, in agreement with the work of Pasternak,² shows that the polarographic reduction of benzophenones in acid media is a one-electron transfer. A mechanism for the reduction of benzophenones compatible with the data is presented.

The experimental data obtained in this study have been interpreted as follows. Substituents which favor an electron withdrawal from the carbonyl group, the site of reaction, facilitate polarographic reductions of the carbonyl group; and those which release electrons to this group decrease the ease of reductions. The half-wave potentials are shown to afford quantitative measures of the net internal electron displacements caused by the substituents. A plot of the half-wave potentials for the substituted benzophenones, benzophenone semicarbazones, and benzophenone oximes *versus* Hammett's substituent constants⁴ shows an essentially linear relationship. This provides a basis for the prediction of the half-wave potentials of other substituted benzophenones and derivatives.

The results of this study have shown that substituents affect the polarographic reduction of benzophenones and certain benzophenone derivatives in a manner predictable in accordance with the electronic theory. On the basis of the observed substituent effect, the reduction process, insofar as the electron transfer is concerned, can be generalized as a nucleophilic attack by the electron(s) on the carbon atom of the carbonyl group.

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Microfilm copy of complete manuscript of 179 pages, \$2.24. Enlargements 6" x 8", 10¢ per page.

CHEMISTRY SAPONINS

(Publication No. 4296)

Floyd Irving Brownley, Jr., 1952
Florida State University, 1952

Saponins are naturally occurring plant glycosides whose aqueous solutions produce stable and copious foams when shaken. The chemical properties of

these substances are not well known, and the purpose of this investigation was to examine some of these properties, and to evaluate methods of determining saponins.

The investigation used six commercial saponins, and another saponin extracted from tung foliage in the laboratory. Preliminary classification tests were made on the saponins, after which the bromine uptake of each of these substances was determined. This was done by utilizing bromine water and aqueous solutions of saponins, and determining the bromine uptake by a standard iodometric method.

Hydrolysis experiments were investigated thoroughly. Two of the commercial saponins were never hydrolyzed, although numerous attempts were made. Methods attempted included the use of both acids and bases as hydrolytic agents, and utilized water, ethanol, and methanol as solvents. Miscellaneous methods tried included enzymatic hydrolysis, the use of ultra violet light, and hydrolysis by both hydrogen peroxide and potassium dichromate. Very poor results were achieved with the commercial saponins, but excellent results were obtained from the saponin extracted from tung foliage.

A number of colorimetric analytical determinations were made on these compounds. Anthrone was used, as it produces a green color in the presence of carbohydrates. Several difficulties were encountered in the use of anthrone. These included the extreme sensitivity of the reagent, and the rapid deterioration of the sulfuric acid solution of anthrone upon standing. The sensitivity was overcome by standardizing the procedure, and the deterioration was remedied by using a solvent other than sulfuric acid.

Sudan dyes were also investigated as possible reagents for the colorimetric determination of saponins. Concentrations of saponin solutions for which the dyes could serve as a means of determining saponin content were determined.

Spectrophotometric determinations were made on the available saponins, revealing maxima in the wave length region of two hundred seventy to two hundred eighty millimicrons. These maxima were found for all but one of the saponins examined, that saponin being one of the commercial products which had resisted hydrolysis.

Microbiological assay was investigated as a possible means of determination of saponins. Both *B. coli* and *L. casei* were utilized in a standard microbiological assay, but neither produced any significant results.

Attempted extraction of saponins was carried out on various portions of the tung tree, *Aleurites fordii*. The nuts, the hulls of the nuts, and the meal remaining after the oil had been pressed from the nuts were all extracted using a number of extraction methods, but no saponin was recovered from these portions of the tung tree. Using the foliage, however, a steroid saponin was extracted. The foliage was ground, extracted with water, concentrated, dialyzed, and the extract containing the saponin hydrolyzed. The sapogenin was precipitated out of solution, was purified, and identified as diosgenin. The sugar residue remained in solution, and was shown to be

glucose. Proof that one glucose molecule was attached to one diosgenin identified this saponin as trillin.

Microfilm copy of complete manuscript of 102 pages, \$1.28. Enlargements 6" x 8", 10¢ per page.

**PART I: THE REARRANGEMENT OF THE
BICYCLO [2,2,2] OCTANE SYSTEM AND
SILVER BROMIDE AS A LEWIS ACID.
PART II: A NEW DECARBOXYLATION
REACTION**

(Publication No. 4256)

Milton Farber, Ph.D.
Columbia University, 1950

Part I

Treatment of the silver salt of bicyclo [2,2,2] octane-2-carboxylic acid (V) with bromine (brominative decarboxylation) afforded 2-bromobicyclo [1,2,3] octane, m.p. 23-27° (VIIa), 44-45.5° (VIIb). The structure of VII was assigned (bromine position tentatively) on the grounds (a) that reduction of VIIa or VIIb gave bicyclo [1,2,3] octane (II), m.p. 139.5-141°, identified by comparison of its infra-red absorption spectrum with that of authentic II and (b) reaction of VIIa with aqueous alcoholic alkali gave an alcohol, m.p. 183-184°, which was identical with an alcohol to which the structure bicyclo-[1,2,3] octanol-2 (X) has been assigned. A similar rearrangement was noted in the brominative decarboxylation of silver bicyclo [2,2,2] octane-2,3-dicarboxylate (XVI).

It was demonstrated that a possible mechanism for the rearrangement involved the action of silver bromide upon the potentially initial product of the brominative decarboxylation, 2-bromobicyclo-[2,2,2] octane (XVIII). Isolation of XVIII was accomplished by means of brominative decarboxylation of the potassium salt of V, a method avoiding the presence of silver bromide, and treatment with silver bromide converted XVIII in good yield to either VIIa or VIIb. The silver bromide-catalyzed rearrangement affords strong experimental support to the hypothesis that silver bromide is a Lewis acid of sufficient strength to weaken observably the carbon-bromine bond of an alkyl bromide, a hypothesis which explains the reported heterogeneous catalysis by silver bromide of reactions of alkyl halides with silver salts. The driving force of the rearrangement is derived from (a) a favorable entropy factor and (b) from the possibly lower amount of strain in the product.

Deamination with nitrous acid of 2-aminobicyclo [2,2,2] octane (XII) led largely to the unrearranged alcohol, bicyclo [2,2,2] octanol-2 (XXI). This lack of rearrangement is explained by the fact that the deamination reaction is rate-controlled, a reaction in which it is postulated that deamination without rearrangement is the fastest reaction. The silver bromide-catalyzed rearrangement, on the other hand, is postulated as being equilibrium controlled, with the thermodynamically stable product (VII) predominating.

The criterion of mixed melting points to establish identity or lack of identity of organic compounds did not apply to the two bicyclic series in this work. Derivatives of each formed solid solutions with the other, and it was pointed out that formation of solid solutions is an apparently general characteristic of bicyclic compounds.

Part II

The decarboxylation of alicyclic 1,2-dicarboxylic acids with lead dioxide to yield the corresponding olefin has been found to proceed in yields up to 35 per cent of the theoretical amount, and decomposition of hexahydrophthloyl peroxide in xylene solution has been found to yield cyclohexene. These reactions have been discussed in terms of a possible free radical or "simultaneous expulsion" mechanism.

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**SOME THERMODYNAMIC PROPERTIES OF
SOLUTIONS OF A LOW MOLECULAR WEIGHT
STARCH AND ITS ACETATE**

(Publication No. 4258)

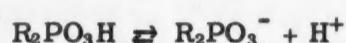
Charles Frank Ferraro, Ph.D.
Columbia University, 1950

The solutions of a highly degraded potato starch of molecular weight 22,200, of a highly degraded corn starch of molecular weight 23,300, and the triacetate of the latter in two component solvents were studied by measurements of osmotic pressure, electromotive force, and relative turbidity. The binary mixtures consisted of salt solutions and mixtures of solvent and precipitant.

The osmotic pressure of the corn starch had the same value when dissolved in water, 0.01 or 0.50 M CaCl₂ solutions. Electromotive force measurements revealed that CaCl₂ in concentrations between 0.01

and 0.10 M did not alter the activity of the starch in its aqueous solutions. These results are in agreement with the mathematical equations derived by Joseph (1).

Although the osmotic pressure of aqueous solutions of the potato starch was found to be less than that of solutions in 0.01M CaCl₂, electromotive force measurements indicated that the activity of the starch was the same in both cases. The osmotic pressure decrease in this case can be attributed to the ionic charge on the potato starch molecule. The charge is due to phosphorus (about one atom per molecule of starch). Applying the Donnan theory of membrane equilibrium (2) and assuming the phosphorus to be present in the molecule as an ester of the type R₂PO₃H, the ionization constant for the equilibrium



was calculated to be 10^{-4} .

The behavior of the corn starch acetate dissolved in acetone-ethanol and dioxane-methanol mixtures as the non solvent concentration was increased was studied by osmotic pressure measurements. The molecular weight of the acetate remained constant as the ethanol concentration was increased from 0 to 55.0%, a value 1.5% less than that required for precipitation of the acetate. Similar results were observed when the methanol concentration was increased from 0 to 1.5% less than the precipitation value of 41.5%. For both systems, the slopes of the osmotic pressure curves (π/c vs c) approached zero as the volume percent of non-solvent approached the critical precipitation value. The value of the parameter μ (3), (4) calculated from these slopes varied from 0.21 to 0.50 for the dioxane-methanol systems and from 0.31 to 0.5 for the acetone-ethanol systems.

The results of the acetate system are in agreement with the conclusions deduced from the models postulated for high polymer solutions. On the basis of these models, a μ value of about 1/4 should be observed for a good solvent and a value of about 1/2 for a poor solvent.

Deviations from normal behavior were observed for the systems corn starch-water-ethanol and corn starch-water-acetone. As the ethanol content was increased from 0 to 44.5%, the measured molecular weight of the starch increased from 23,300 to 175,000 before precipitation occurred. A value of 117,000 was obtained for the water-acetone system as the concentration of the acetone was increased to 40.0%. These latter values of non-solvent concentration were 1 to 2% less than those required for the critical precipitation of the starch. The value of μ was 0.5 for starch dissolved in water, and it remained at this value throughout the addition of either acetone or ethanol. Recent theory (4) would lead one to expect the formation of a second phase for this value of μ , but this was not observed in the time necessary for carrying out the measurements. However, on standing for longer periods of time (24 to 28 hours), a second crystalline phase appeared. This fact alone would vitiate the use of high polymer solution theory which in its present state considers the formation

of a second phase only in the form of a gel, i.e. a precipitate of disoriented molecules.

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MASS TRANSFER FROM PACKING TO ORGANIC SOLVENTS IN SINGLE-PHASE FLOW THROUGH A COLUMN

(Publication No. 4259)

Bernard J. Gaffney, Ph.D.
Columbia University, 1950

Mass transfer coefficients have been determined for three organic solvents flowing through a three inch glass column packed with 0.25 to 0.50 inch pellets of organic acids. The Schmidt number varied from 150 to 13,000 and a modified Reynolds' number from 0.8 to 1,500. Inlet concentrations and height of bed were varied. All physical constants including diffusivities were measured.

The value of aH_i increased with the 0.58 power of the Schmidt number and increased with Re' at a rate decreasing as Re' increased. Discrepancies between upflow and downflow results were found to be associated with natural mass convection within the bed.

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ALSTONIA ALKALOIDS, III. FURTHER INVESTIGATION INTO THE CONSTITUTION OF ALSTONINE. REDUCTION, OZONOLYSIS AND SPECTROGRAPHIC STUDIES

(Publication No. 4260)

Allan Poe Gray, Ph.D.
Columbia University, 1950

This dissertation is concerned with the molecular structure of the alkaloid, alstonine, extracted from the bark of *Alstonia constricta*. Previous work has shown the alkaloid to possess the empirical formula, C₂₁H₂₀N₂O₃, to have one methoxyl group in the form of a methyl ester and no N-methyl group. The alkaloid has been shown to have a β -carboline nucleus.

In the present work, reduction of tetrahydroalstonine, C₂₁H₂₄N₂O₃, with lithium aluminum hydride led to tetrahydroalstonol, C₂₀H₂₄N₂O₂. Tetrahydroalstonol has been found to be very labile toward acidic

reagents, and undergoes etherification and dehydration under very mildly acid conditions. Catalytic reduction of tetrahydroalstonol in 30% acetic acid led to desoxyhexahydroalstonol, $C_{20}H_{26}N_2O$. Ozonolysis of tetrahydroalstonine under carefully controlled conditions yielded a small amount of a product, $C_{20}H_{22}N_2O_4$. A series of reactions has been carried out on yohimbine, $C_{21}H_{26}N_2O_3$, leading to yohimbyl trimethylammonium toluenesulfonate, $C_{23}H_{34}N_3O \cdot C_7H_7O_3S$.

The infra-red spectra of alstonine, tetrahydroalstonine, tetrahydroalstonol, hexahydroalstonol, 5-carbomethoxyharmon, yohimbine and yohimbyl alcohol have been studied with a view to learning more concerning the structure and functional groups present in alstonine. Ultra-violet absorption spectra were studied and active hydrogen determinations made with similar ends in mind.

The significance of the chemical and physical evidence with regard to alstonine is discussed. On the basis of present knowledge it is felt that alstonine possesses a penta-cyclic system, an α,β -unsaturated ester system and may contain a cyclic ether linkage. In view of the evidence possible skeletal structures are discussed for alstonine. In the course of the work infra-red evidence is advanced in support of the present formulation of yohimbine as a β -hydroxy ester.

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THE SYNTHESIS OF 9, 10-DIHYDRO-9,10-(11-AMINOETHANO)-ANTHRACENE AND 9, 10-DIHYDROANTHRACENE-9, 10-ENDOETHYLENEIMINE

(Publication No. 4065)

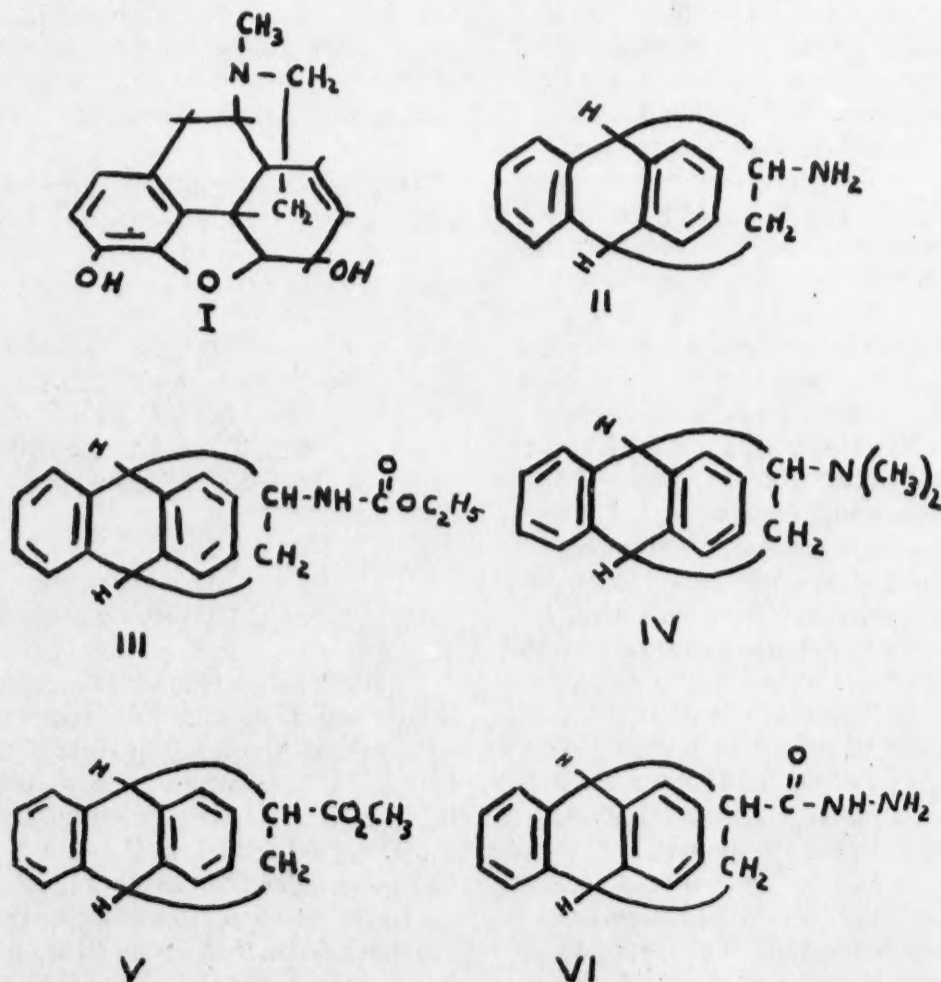
Jules Verne Hallum, Ph.D.
State University of Iowa, 1952

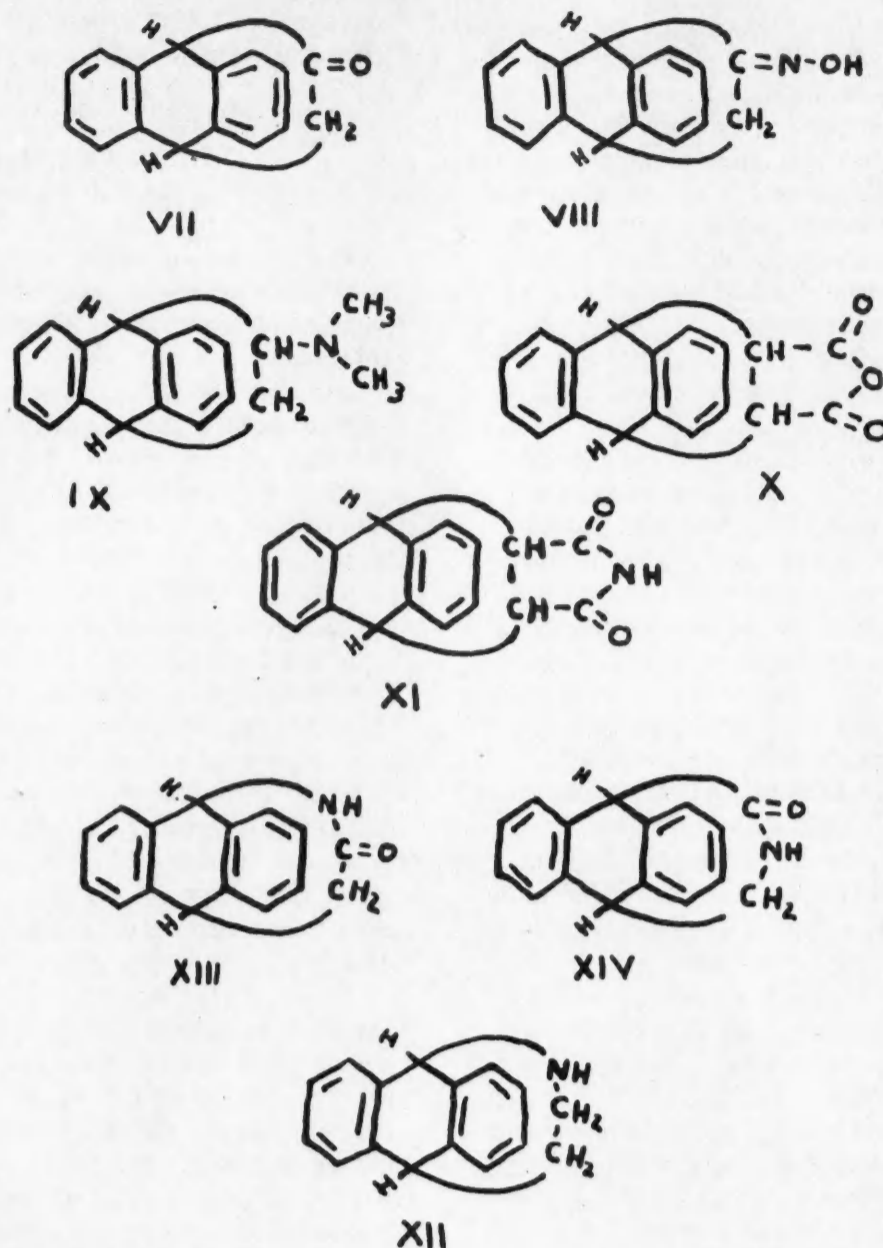
An investigation has been carried out to determine the contribution of the three-dimensional structure of morphine (I) to its analgetic behavior by the synthesis of 9, 10-dihydro-9,10-(11-aminoethano)-anthracene (II), its corresponding urethan (III), and 9, 10-dihydro-9, 10-(11-dimethylaminoethano)-anthracene (IV).

These simpler compounds have a three-dimensional structure similar to morphine and will thus provide an evaluation of this feature.

The amine (II) and the urethan (III) were prepared by converting the Diels-Alder adduct of anthracene and methyl acrylate (V) with hydrazine hydrate to the corresponding hydrazide (VI). This hydrazide was then rearranged to the urethan (III) by treatment with nitrous acid in ethanol and the latter hydrolyzed to the amine (II) by acid.

The structure of the amine (II) was proved by synthesis from the Diels-Alder adduct of anthracene and vinyl acetate. Transesterification gave the corresponding alcohol which could be oxidized to the ketone (VII). Treatment of the ketone with hydroxylamine





hydrochloride gave the oxime (VIII) which could be reduced with sodium and alcohol to the amine (II).

Neither the amine (II) nor the urethan (III) was found to exhibit analgetic activity although the urethan acted as a sedative.

9, 10-Dihydro-9, 10-(11-dimethylaminoethano)-anthracene (IX) was prepared by methylation of the primary amine (II) with formic acid and formaldehyde.

The conditions for converting either the adduct of anthracene and maleic anhydride (X) or of anthracene and maleimide (XI) to the amine (I) were not found.

The preparation of 2, 5, 6, 7-tetrahydro-3, 4-benzo-2, 5-benzazepine (XII), an amine more closely resembling morphine by a lithium aluminum hydride reduction of the lactum (XIII or XIV), obtained by a Beckman rearrangement of the oxime (VIII), was unsuccessful.

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PHYSICO-CHEMICAL STUDIES OF THE SIMPLER POLYPEPTIDES

(Publication No. 4264)

Edward F. Hammel, Jr., Ph.D.
Princeton University, 1944

Abstract not available.

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MASS SPECTROMETRIC EXAMINATION OF THE CATALYTIC ISOMERIZATION OF n-PROPYL CHLORIDE AND THE CATALYTIC EXCHANGE OF ACETONE AND PROPANE WITH DEUTERIUM

(Publication No. 4262)

Lois Nash Kauder, Ph.D.
Columbia University, 1950

The products of the isomerization of n-propyl chloride on aluminum chloride in the presence of

deuterium chloride have been examined with a mass spectrometer to obtain information about the mechanism of the rearrangement. If, as frequently postulated, the isomerization occurs by elimination of hydrogen chloride and recombination according to Markownikoff's rule, a reasonable concentration of deuterium would be expected in the isopropyl chloride. Since no deuterium was found in the product, the experiments seem to establish the fact that the rearrangement at low temperatures (0°) and pressures (about 5-10 cm) does not proceed to any appreciable extent by the elimination of hydrogen chloride.

The experiments were carried out in 300 cc reaction vessels into which about .01 g. of aluminum chloride had been sublimed. Mixtures containing 5 cm each of deuterium chloride or hydrogen chloride and n-propyl chloride were allowed to react at 0° . Samples were withdrawn at suitable time intervals for analysis with a Nier type mass spectrometer. Similar experiments were carried out in which propene was allowed to react with hydrogen chloride or deuterium chloride under the same conditions.

The mass spectral data show that after one hour at 0° when isomerization was practically complete, no deuterium was found in the isopropyl chloride. Under these same conditions and on the same catalyst deuterium chloride added to propene to give isopropyl chloride containing deuterium.

The extent of isomerization in a given length of time (60 to 70% in five minutes at 0°) was not appreciably changed by the presence of either hydrogen chloride or deuterium chloride. This is further indication that hydrogen chloride is probably not involved in the rate determining steps of the isomerization. The hydrochlorination of propene occurred under the same conditions but at a slower rate (10 to 20% in five minutes at 0°) with some polymerization. With an equal molar mixture of hydrogen chloride and deuterium chloride, the hydrogen chloride added 2.0 times faster than did the deuterium chloride.

In view of the above experiments some other mechanism must be involved, possibly the formation of a carbonium ion, or its equivalent, followed by an intramolecular hydride ion shift and recombination with a chloride ion of the catalyst.

The reduction of acetone with deuterium on platinized platinum was attempted at low temperatures (-20°C) in an effort to prepare pure $\text{CH}_3\text{CD}_2\text{CH}_3$. It was found that exchange took place rapidly with all the hydrogen atoms; more rapidly than the reduction.

The products of the exchange of propane with deuterium in presence of platinized platinum were examined in the mass spectrometer to determine position of exchange. Thermal conductivity measurements allowed overall rate studies.

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GAMMA LOOP STUDIES IN THE IRON-VANADIUM AND THE IRON-VANADIUM-TITANIUM SYSTEMS

(Publication No. 3975)

William Ray Lucas, Ph.D.
Vanderbilt University, 1952

The alpha to gamma (Ac3) transformation temperature was investigated by the dilatation method in the iron-vanadium and the iron-vanadium-titanium systems.

The iron-vanadium system was investigated in order to establish the gamma loop in this system. The alloys were prepared from Armco iron and carbon-free ferro-vanadium by melting the iron in an induction furnace and then adding ferro-vanadium to the molten metal. The metal was cast in baked, core-sand molds, and from these castings, dilatation samples and samples for analyses were prepared.

A heating rate of 3°C . per minute was found to be most practical for determining the beginning of the Ac3 transformation, but when the transformation began, the heating rate was decreased so that the temperature of the dilatation furnace was increased only a few degrees in several hours. This was necessary because the Ac3 transformation in iron-vanadium alloys is sluggish, and sometimes several hours were required for the transformation to be complete.

The Ac3 transformation temperatures were determined in fifteen alloys, and from these data, the gamma loop was constructed. It was determined that a small amount of vanadium of the order of 0.2 per cent lowers the temperature of the Ac3 transformation to a minimum point and that a greater amount raises the temperature of this transformation until it is eliminated when approximately 1.5 per cent of vanadium is present, thus producing a closed gamma loop. By determining the beginning and the end of the Ac3 transformation, it was possible to establish a double curve to represent the gamma loop. The outer curve extending to approximately 1.5 per cent vanadium represents the solubility of vanadium in alpha iron, and the inner curve extending to approximately 1.4 per cent vanadium represents the solubility of vanadium in gamma iron.

The iron-rich corner of the iron-vanadium-titanium system was studied in order to ascertain the effect on the Ac3 transformation of alloying two gamma-loop-forming elements in varying proportions with iron. The alloys were prepared in the same manner as described for the iron-vanadium system except that sponge titanium was added to the molten iron in addition to the vanadium.

Twenty-three alloys of iron, vanadium, and titanium were studied, and the beginning and end of the Ac3 transformation were determined in each case. A heating rate of 2 to 3°C . was maintained throughout the transformation. A boundary was established between austenitic and ferritic alloys in this three-component system, and it was shown that vanadium and titanium when added together are less than additive in their effect on the Ac3 transformation in iron. The addition of vanadium to the

iron-titanium system lowers the amount of titanium required to produce a closed gamma loop as is the case when titanium is added to the iron-vanadium system, but the effect of the first 0.2 per cent of either titanium or vanadium when added to a binary alloy of iron and the other metal is very small.

Isotherms were drawn for several different temperatures on an equilateral triangle plot showing the various alloys studied. These isotherms were drawn using data obtained in this work and data on the iron-titanium system from the literature. From this plot, one is able to get an idea of the Ac3 transformation temperature of any alloy within the austenitic region. A three-dimensional model of the gamma iron or austenitic region in the iron-vanadium-titanium system was constructed, and photographs of this model are presented in the thesis.

Microfilm copy of complete manuscript of 56 pages, \$1.00. Enlargements 6" x 8", 10¢ per page.

THE MICROWAVE SPECTRUM OF AN ASYMMETRIC TOP MOLECULE CONTAINING TWO IDENTICAL QUADRUPOLEAR NUCLEI

(Publication No. 4101)

George Wilse Robinson, Ph.D.
State University of Iowa, 1952

The microwave spectrum of phosgene has been studied in the region 23,000 - 27,000 megacycles. An assignment of the spectrum was arrived at through study of the quadrupolar hyperfine structure. The quadrupolar energy terms were obtained by diagonalization of the first-order Hamiltonian of a system containing two quadrupolar nuclei of spin 3/2 and relative line strengths of the hyperfine structure components were also computed.

The structure of the molecule was ascertained from the spectra of the two isotopic modifications $\text{COCl}^{35}\text{Cl}^{35}$ and $\text{COCl}^{35}\text{Cl}^{37}$. The observed bond distances are:

C-O	1.166 ± 0.002	Å
C1-C1	2.884 ± 0.001	
C-C1	1.746 ± 0.004	

which agree very well with recent electron diffraction measurements.

The quadrupole coupling constants eQV_{aa} and eQV_{bb} for $\text{COCl}^{35}\text{Cl}^{35}$ were determined from the hyperfine structure of the spectrum. From these values, the quantities eQV_{xx} , eQV_{yy} and eQV_{zz} in the bond axis coordinate system were estimated by assuming a reasonable value of the cross derivative V_{xz} . The ratio V_{yy}/V_{xx} was quite small indicating, according to the present theories, a very large amount of s-p hybridization in the C-C1 bond.

The hyperfine structure of the $\text{COCl}^{35}\text{Cl}^{37}$ spectrum could not be fit to the accuracy obtained for the symmetrical modification since the value of V_{xz} was not known accurately enough to determine its effect on the coupling constants of the two isotopic chlorine

atoms. Furthermore an attempt to obtain an experimental value of V_{xz} failed because the low intensities of many of the hyperfine components made it difficult to obtain frequency measurements of the required accuracy.

The success of this work makes available for microwave study an entirely new series of molecules, namely, those containing two identical quadrupolar nuclei symmetrically located with respect to a C_2 axis in the molecule. The complications usually arising from asymmetry are alleviated by the presence of characteristic hyperfine structural patterns.

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THE POTENTIAL ENERGY CURVE OF MERCURY HYDRIDE

(Publication No. 4112)

Sister Mary Helene Ven Horst, Ph.D.
State University of Iowa, 1952

A potential energy curve for the mercury hydride molecule is constructed which takes into account the fact that the molecule can change from a structure bonded by exchange forces below about 2.65 Å to a quasi-molecule held together by London dispersion forces at larger distances. The Oldenberg and Rydberg corrections are considered.

The occurrence of the eight to ten weak intensity maxima observed in the region of the continuum is interpreted. It is supposed that the vibrational level system of the ground electronic state would continue as given by the vibrational states 0, 1, 2 and 3 were it not for the fact that the change in the force field causes the molecule to dissociate. In other words in the continuum there are regions which the molecule can reach from the upper electronic states

($A^2\pi_{1/2}$ or $A^2\pi_{3/2}$) and from which it can either dissociate into atoms with kinetic energy or from which it can return to some lower energy level. If the latter possibility predominates, then the appearance of the intensity maxima can be understood. The term values and a heat of dissociation for this hypothetical molecule are estimated.

The breaking off of certain bands can be explained on the basis of maxima in vibrational-rotational energy curves. The tunnel effect, characteristic of radioactive disintegration, is studied in its application to dissociation of a molecule at high rotational levels. It is found to be more important than the dissociation by rotation.

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THE STUDY OF REACTIONS OF QUATERNARY AMMONIUM POLYIODIDES AND POLYBROMIDES

(Publication No. 4119)

James Peter Yuk, Ph.D.
State University of Iowa, 1952

A study of the absorption spectra of the tetramethylammonium polyiodides: $(\text{CH}_3)_4\text{NI}_3$, $(\text{CH}_3)_4\text{NI}_5$, NI_5 , and $(\text{CH}_3)_4\text{NI}_7$ in ethylene chloride showed that the pentaiodide, and the enneaiodide were dissociated into the triiodide and iodine. The degree of dissociation of tetramethylammonium triiodide and tetrabutylammonium tribromide in ethylene chloride was measured spectroscopically and the following pK values were obtained 7.0 ± 0.2 and 5.9 ± 0.2 , respectively.

The kinetics of bromine addition were studied in detail with trans-crotonic acid using tetramethylammonium tribromide as catalyst in ethylene chloride. The rates of addition were also determined with tiglic and dimethylacrylic acids. When the addition was carried out by tetramethylammonium tribromide, the rate was greater than with bromine. The rate of addition was even faster when a mixture of bromine and tribromide complex was present. A possible mechanism has been proposed which is in an agreement with the kinetics and the existing mechanisms of bromine addition. The rate was found to be first order with respect to the concentration of the bromine, of the unsaturated acid, and of the tribromide complex.

The rate constant for bromine addition to crotonic acid with bromine-tribromide mixture was found to be $9.05 \times 10^{-2} \text{ liters}^2 \text{ mole}^{-2} \text{ sec}^{-1}$ at 30° while with tribromide the rate constant was $1.43 \times 10^{-3} \text{ liters}^{3/2} \text{ mole}^{-3/2} \text{ sec}^{-1}$.

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ENGINEERING

THE INFLUENCE OF SOIL MIXTURES ON TURF GROWTH AND SOIL STABILITY FOR HIGHWAY SHOULDERS AND AIRPORTS

(Publication No. 4022)

Gail Charles Blomquist, Ph.D.
Michigan State College, 1952

The investigational study was initiated in 1944 for the study of the growth of grasses on various soil mixtures, available in Michigan, for construction of highway shoulders, airstrips and airports. This project was carried out jointly with the Soil Science Department of Michigan State College and the Research Division of the Michigan State Highway Department.

The main objective of the study was to determine the effects of mixing various amounts and kinds of soils into the top six inches of the commonly employed sand and gravel subbases, base courses or shoulder materials, on growth of various grasses and also upon the stability of the shoulders produced with the varying soils and grasses.

The report includes a description of the test area, and a discussion of the turf development on various soil mixtures. In addition, methods of conducting stability tests, penetrometer tests, density tests and correlative studies on the individual grass plots are discussed together with the test results.

The results of the test sections indicated that Chewing fescue grass was an excellent grass to plant on shoulder and runway surfaces stabilized with sandy or gravelly material. The later tests showed very good results of carrying capacity on sections in which quack grass crowded out the original grasses. This can be attributed mainly to its widespread root-basket and heavy top growth which flourished on all soil types and climatic factors involved in the test. Topsoils consisting of Miami loam, Brookston loam and Bellefontaine sandy loam can be satisfactorily mixed with sands and gravels to produce a turf, while clay and peat had varying results. Chewing fescue was best suited when planted with small amounts of nursegrass to aid in starting and protecting the slower growing fescue. An excess of the so-called nurse-grass was detrimental to the establishment of a cover of Chewing fescue since the nurse-grass flourished the first year following quick germination and died out leaving a sparse cover of fescue the second and subsequent years. Fertilizing and reseeding were required to maintain a good stand. The results are not based on any reseeding or additional fertilization since attempts were made to minimize any and all variables to obtain analyzable data.

The rutting tests indicated that all of the soil mixtures under study did not possess satisfactory stability characteristics when wet. When all factors are considered the data would indicate that the processed gravel, 22-A, is the best of all the soil mixtures in relation to stability and turf growth.

The study of the load bearing tests and penetrometer studies indicated a definite relation whereby dependable data can be obtained with special penetrometers to predict load bearing values of greater magnitude. Two correlative studies of varying nature proved valuable and dependable for predictions of load bearing values.

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THE ENERGY METHOD IN CYLINDRICAL SHELL THEORY

(Publication No. 3991)

Dale Ringwalt Carver, Ph.D.
University of Illinois, 1952

A strain energy expression for the cylindrical

shell is developed which includes the effect of certain non-linear terms in the relations between the strains and the displacements. The strain energy is formulated as an integral in terms of the displacements of the middle surface using Love's assumptions. The variable pressure acting upon the shell is assumed to be normal to the middle surface. The potential energy of this pressure is expressed as an integral in terms of the radial displacement of the middle surface. The principle of virtual work or of minimum potential energy is then used to determine the equilibrium equations. Euler's variational equations applied to the total potential energy yield three non-linear differential equations in the displacements of the middle surface.

If the flexural rigidity factor of the shell is assumed negligible the equations reduce to those of the non-linear membrane theory. The non-linear membrane equations permit imposition of boundary conditions on the displacements, but the action at the edges is likely to be principally that of bending and the non-linear membrane theory, since it fails to give bending stresses, has no advantage over the linear membrane theory.

The general non-linear equations combine to yield linear differential equations in the radial displacement in two special cases. In the case of axial symmetry the equations combine to yield a known equation which has been used to determine the buckling load on an axially loaded shell. In this case the retention of the non-linear terms apparently has a negligible effect on computed bending stresses.

In the case of the infinitely long shell or the extremely short shell or ring all dependence upon the longitudinal coordinate vanishes, and the non-linear equations combine to yield a linear differential equation in the radial displacement, and an equation which states that the strain of the middle surface is a constant. These equations provide an extensional theory of buckling of rings. According to the equations the first mode of buckling occurs at a value of the external pressure P of $P = 2.25 D/a^3$ in which D is the flexural rigidity factor and a is the radius of the middle surface. Previous investigations have arrived at a value of $P = 3D/a^3$ using an inextensional theory.

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ON LARGE DEFLECTION OF ANNULAR AND CIRCULAR PLATES UNDER UNIFORM NORMAL PRESSURE

(Publication No. 3992)

Ming Mao Chen, Ph.D.
University of Illinois, 1952

The differential equations for large deflections of flat plates were derived by von Kármán in 1910. These equations contain the linear differential operator of the fourth order and quadratic terms in the

second derivative. The solution of these equations in the general case is unknown and only a few cases have been solved with considerable labor. For large deflection of an annular plate, that is, a circular plate with a concentric hole, the von Kármán equations can be reduced to ordinary non-linear differential equations.

Annular plates are members which are widely used in engineering work, such as Kingsbury thrust-bearing plates, diaphragms of all kinds as used in telephones, steam turbines, diffusers, piston heads, certain types of cylinder heads, and ends of pressure vessels. Most of the expressions used in such design work are based on the classical (or linearized) theory and the large deflection theory becomes more important when the pressure applied is high.

In this investigation, the basic differential equations for annular plates under uniform normal pressure and their approximate solutions in series form with certain boundary conditions have been obtained. The perturbation method is used in solving such equations and the ratio of the inner edge deflection to the thickness of the plate is taken as the perturbation parameter. The basic differential equations are solved by this method for the following two sets of boundary conditions. First, the outer and inner edges are fixed-clamped, that is, there is no radial displacement nor angular deflection at the edges, but there is a relative normal displacement of the inner and outer edges. Second, the outer and inner edges are loose-clamped, that is, there is no radial membrane stresses at the edges but radial displacements are permitted. For the special case of circular plates with no hole, the basic differential equations are solved for the following three sets of boundary conditions, namely, 1. loose-clamped, 2. simply supported, 3. hinged supported. The expressions for the deflections and membrane stresses etc. are given in explicit forms. The pressure-deflection, stress-deflection, and stress-pressure relations for circular plates and the pressure-deflection relations for annular plates are plotted. For the simply supported case, the present results agree with the existing solutions.

This investigation was carried out in the Department of Theoretical and Applied Mechanics of the University of Illinois of which Professor F.B. Seely is the head. Acknowledgement is made to Professor Seely, under whose general supervision, and to Professor J.O. Smith, under whose immediate supervision, the investigation was conducted.

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I. PROPAGATION OF SMALL SHOCK WAVES
FROM A SPHERICAL CAVITY IN AN INFINITE
ISOTROPIC ELASTIC MEDIA.

II. A MULTITUBE DIFFERENTIAL PRESSURE
MANOMETER FOR MEASURING
THE AVERAGE FLOW OF FLUIDS IN
CLOSED DUCTS.

(Publication No. 3993)

George Bromley Clark, Ph.D.
University of Illinois, 1952

Solution of the spherical wave equation for elastic media for suddenly applied pressures is conveniently accomplished by means of Laplace transforms. The familiar spherical wave equation * is, in terms of the displacement potential:

$$(1) \quad \frac{\partial^2(r\phi)}{\partial r^2} = \frac{1}{c^2} \frac{\partial^2(r\phi)}{\partial t^2}$$

The boundary conditions for the problem are:

$$(2) \quad \begin{aligned} r=a \quad t>0 \quad \sigma_r &= (\lambda+2G) \frac{\partial^2\phi}{\partial r^2} + \frac{2\lambda}{r} \frac{\partial\phi}{\partial r} \\ r>a \quad t=0 \quad \frac{\partial(r\phi)}{\partial t} &= 0 \quad r\phi=0 \end{aligned}$$

Obtaining the solution involves transforming both the wave equation and the boundary conditions by means of a complex integral, solving the transformed equation and then inversely transforming this result to give the final solution to the problem.

Equation (1) when transformed becomes:

$$(3) \quad \frac{d^2(\bar{r}\phi)}{d\bar{r}^2} - \frac{p^2}{c^2}(\bar{r}\phi) = 0$$

Likewise, the transformed boundary equation becomes:

$$(4) \quad (\lambda+2G) \frac{d^2\phi}{d\bar{r}^2} + \frac{2\lambda}{\bar{r}} \frac{d\phi}{d\bar{r}} = -\frac{1}{p}$$

The solution of (3) for the given boundary conditions is:

$$(5) \quad \bar{r}\phi = -\frac{ae^{-\frac{p}{c}(\bar{r}-a)}}{p \left[\frac{\lambda+2G}{c^2} p^2 + \frac{4G}{ca} p + \frac{4G}{a^2} \right]}$$

and its inverse transform and final solution, found by means of summing the residues at the poles, is:

$$(6) \quad r\phi = \frac{a^3}{4G} \left\{ -1 + e^{-\frac{2cG}{a(\lambda+2G)}(t - \frac{r-a}{c})} \left[\frac{G}{\sqrt{(\lambda+G)G}} \sin \frac{2c}{a} \frac{\sqrt{(\lambda+G)G}}{(\lambda+2G)} (t - \frac{r-a}{c}) + \cos \frac{2c}{a} \frac{\sqrt{(\lambda+G)G}}{(\lambda+2G)} (t - \frac{r-a}{c}) \right] \right\}$$

From (6) the proper expression for the displacement may be found by means of the relation $U = \frac{\partial\phi}{\partial r}$ and the whole simplified by means of the approximation $\lambda = G$:

$$(7) \quad U = \frac{a}{4G} \left[\left(\frac{a}{r} \right)^2 - \sqrt{\frac{3}{2}} \left(\frac{a}{r} \right)^2 e^{-w\tau} \sin(w\tau + \tan^{-1}\sqrt{2}) + \sqrt{2} \left(\frac{a}{r} \right) e^{-w\tau} \sin w\tau \right]$$

where

$$w = \frac{2c}{a} \frac{\sqrt{2}}{3}$$

$$\tau = t - \frac{r-a}{c}$$

The behavior of this expression may be determined and plotted for various values of r and t . Also, appropriate mathematical expressions for the tangential and radial stresses may be determined from (7) by use of the proper elastic equations. Both the technique of the application of Laplace transforms and the solution of the wave equation as given should prove very useful in arriving at a better understanding of the fundamentals of blasting solid materials with high explosives.

PART II.

A multitube manometer was designed to facilitate the measurement of the average flow of air in closed ducts, in short, to permit the reading of the average velocity in one direct reading rather than performing the standard Pitot tube traverse and its tedious calculations. The average velocity gage was designed in such a manner as to perform mechanically the operation indicated on the right side of equation (1). That is, the relationship between height and volume

$$(1) \quad V_{av} = \frac{1097.4}{20 \sqrt{w}} \sum_{i=1}^n \sqrt{h_i}$$

of specially designed manometer tubes was employed to linearize the fractional power on the right of the summation sign in order to make the summation mechanically possible.

Three types of tubes were found which would provide that the volume of oil displaced therefrom would be proportional to the square root of the height (velocity pressure). These are: (1) a cylinder generated as a volume of revolution by the curve $r = \left(\frac{K}{2\pi h^{\frac{1}{2}}} \right)^{\frac{1}{2}}$, (2) a right circular cylinder with a core generated by the curve $r = \left(r_1^2 - \frac{K}{2\pi h^{\frac{1}{2}}} \right)^{\frac{1}{2}}$, and (3) a small bore tube bent to the curve whose equation is $x = \sqrt{h} \sqrt{\frac{K^2}{4} - h} + \frac{K^2}{4} \sin^{-1} \frac{2\sqrt{h}}{K}$. The latter was found to be the most

practicable and a gage was constructed using twenty curved tubes connected to twenty fixed Pitot tubes on one end and to a common reservoir at the other ends, and thence to a volume measuring tube. The instrument was provided also with a variable scale to

permit adjustment for various weights of air encountered in the laboratory. Tests showed that the gage is accurate within one per cent.

A mathematical analysis of the oscillating characteristics of the manometric fluid in the curved tubes shows that the differential equations of motion are non-linear and their solutions are elliptic integrals. The character of the oscillations shows the gage to be self-damping.

*See Timoshenko, S., Theory of Elasticity.

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NONLINEAR TORSIONAL VIBRATION IN TWO DEGREES OF FREEDOM

(Publication No. 3999)

Tzu Chuen Huang, Ph.D.
University of Illinois, 1952

In this paper an analysis has been made based on equations governing the motion of torsional vibration dampers in two degrees of freedom. Harmonic analyses are illustrated for the cases of (1) the forced vibration with non-linear restoring force, damping neglected; (2) the free vibration with non-linear restoring force, damping neglected; and (3) the forced vibration with non-linear restoring force, small viscous damping considered. Amplitudes of vibration and equations for response curves are derived based on the mathematically justified perturbation series and the response curves for the first two cases could be plotted schematically. Subharmonics of order one-third are investigated for the cases of (1) the subharmonic response; and (2) the subharmonics with damping. Conditions under which such subharmonics could exist are obtained if damping is neglected. In the case of subharmonics with damping, the condition that the damping should be small must be satisfied in order that these subharmonics might exist. The response behavior is also investigated for the case with assumed non-linear damping using the van der Pol method in the manner applied by Andronow and Witt as it is modified for problems in two degrees of freedom. The experimental systems consisting of rubber ring dampers show little non-linearity except in the response curves which exhibit only a slight soft spring in nature.

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HEAT AND MOMENTUM TRANSFER IN TURBULENT FLOW OF MERCURY

(Publication No. 4200)

Sheldon E. Isakoff, Ph.D.
Columbia University, 1952

The use in estimating heat transfer coefficients of the hypothesis that the eddy diffusivities ϵ_M for momentum and ϵ_H for heat are equal (or, alternatively, proportional), known as the Reynolds Analogy between the transfer of momentum and the transfer of heat, has heightened interest in the experimental determination of these quantities. The equations defining ϵ_M and ϵ_H are:

$$\frac{g_c}{\rho} = - \left(\mu/\rho + \epsilon_M \right) \frac{dU}{dr}$$

and

$$\frac{q}{c_p} = \left(\frac{k}{c_p} + \epsilon_H \right) \frac{dt}{dr}$$

when written in the forms appropriate for a circular tube with boundary conditions symmetrical about the axis. The diffusivities are calculable from the slopes of experimental velocity and temperature profiles. The physical properties of liquid metals make them desirable as test fluids in the experimental determination of temperature distributions during turbulent flow.

An apparatus was developed with which mercury flowing vertically in a 1.5-in. stainless steel tube could be accurately traversed for velocity and temperature at cross-sections at which terminal profiles would be established. An electrical heating system was employed whereby a constant heat flux could be supplied to the test section. The velocity probe was an impact tube whose outside diameter at the tip end was 0.008 in. The temperature probe closely resembled that for velocity except that the tip was solid and bore a butt-welded junction of 0.003-in. diameter iron and constantan wires.

Velocity distributions were obtained isothermally for Reynolds Moduli ranging from 125,000 to 500,000. The velocity profiles for mercury agree essentially with those for other fluids. The ratio of the velocity at distance y from the wall to that at the axis was in excellent agreement with the empirical equation,

$$\frac{U}{U_c} = (y/R)^a.$$

Temperature profiles were determined over a range of Reynolds Modulus from 36,700 to 373,000, at essentially a constant Prandtl Modulus of 0.0239, and at heat fluxes up to 9900 BTU/(hr.) (sq.ft.). The temperature traverses were made at Stations 58 and 138 diameters from the inlet. Except at the very highest velocities, the temperature probe could approach the wall close enough to provide points in the region where the slope of the profile agreed with that computed from the heat flux on the assumption that the eddy diffusivity for heat in the vicinity of the wall was negligible. The inside wall temperatures obtained by thus extrapolating the profile were in

excellent agreement at moderate heat fluxes with those estimated from the indications of thermocouples mounted on the outside of the wall. At the highest heat fluxes, the discrepancy between the two estimates was sometimes as much as 25% of the temperature difference between the wall and the mean mixed mercury temperature; in the same circumstances, however, the average deviation of the indications of wall thermocouples at a single cross-section was of the same order. Preliminary experimentation made very clear the necessity of using several thermocouples at a cross section, when as here, an external winding is used to supply a high heat input. Microscopic differences in mounting the thermocouples readily result in significantly different temperature readings.

The calculated ratio of the eddy diffusivity for heat to that for momentum is not 1.0, nor is it constant as assumed by Martinelli (1) and others; it varies directly with the 0.46 power of the Reynolds Modulus, and as a function of relative position in the cross section that is independent of Reynolds Modulus.

Computed heat transfer coefficients are well approximated by the Martinelli equation, but a more rapid increase with Reynolds Modulus is found. Coefficients at Station I, 58 diameters from the inlet, are approximately 12% higher than those at Station III, 138 diameters from the inlet. No additional thermal resistance due to "non-wetting" of the stainless steel tube is indicated.

1. "Heat Transfer to Molten Metals," R. C. Martinelli, Transactions of the American Society of Mechanical Engineers, Vol. 69, 1947, pp. 947-959.

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THE ELASTIC AND STRUCTURAL PROPERTIES OF ASBESTOS CEMENT

(Publication No. 4127)

Chao Pe Jen, Ph.D.
University of Minnesota, 1952

The purpose of this thesis is to determine the suitability of asbestos-cement as a structural material.

It is believed that asbestos-cement is a suitable material for building construction, especially as columns. Besides that, asbestos-cement is fire-proof, attractive in appearance and economical. A series of strength tests were made to establish the structural properties of this material. These tests, which were sponsored by Johns-Manville Company, form the basis for the following conclusions:

I Elastic Properties

1. Modulus of elasticity is 2,400,000 pounds per square inch.
2. Poisson's ratio ranges from 0.10 to 0.36.

3. Stress is proportional to strain up to a stress of 5,000 pounds per square inch.

4. Moisture has very little effect on its elastic properties.

5. After 180 cycles of freezing and thawing, the flexural stress was 2,000 pounds per square inch. It has been indicated its high durability strength.

II Ultimate Stresses

1. Compressive stress is 8,500 pounds per square inch.
2. Tensile stress is 1,600 pounds per square inch.
3. Double shearing stress is 3,000 pounds per square inch.
4. Bearing capacity on asbestos-cement board is 14,000 pounds per square inch.

III Structural Tests

1. Joint Strength

(a) Shear strength of Duco cement when used on asbestos-cement is 270 pounds per square inch.

(b) For bolted joints, the bearing stress is over 12,800 pounds per square inch.

2. Simple Beam

(a) The tensile fibre stress was found to be approximately 2,000 pounds per square inch.

(b) The ordinary flexural theory is applicable to this material.

3. Transite Pipe Column

(a) Transite pipe column has high compressive strength up to 9,780 pounds per square inch.

(b) Lateral deflection is small before the ultimate load is reached.

(c) The empirical formula for ultimate stress may read as follows:

$$\frac{P}{A} = 10,000 - 60 \left(\frac{l}{r} \right)$$

Here P = Ultimate load in pounds

A = Cross-sectional area of column in square inches

l = Total unsupported length in inches

r = Radius of gyration of column in inches

4. Asbestos-Cement Truss

Three trusses were tested, the testing results indicated that,

(a) On trusses, the applied loads were close to the computed values.

(b) Both glued and bolted joints developed sufficient strength.

IV Proposed Specifications and Numerical Examples

A proposed specifications for the design of asbestos-cement for buildings has been applied to two numerical examples which indicated that,

(a) Asbestos-cement is a suitable and workable material for structural uses.

(b) Transite pipe columns are very strong and economical in comparison with reinforced concrete columns.

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FLOTATION OF COPPER SILICATE BY SELECTED ALKYL SUBSTITUTED POLYHYDROXY NITROSO PHENOLS

(Publication No. 4027)

Marvin Duane Livingood, Ph.D.
Michigan State College, 1952

This research work was undertaken with the idea of securing a reasoned approach to the flotation of minerals. By the application of known chemical and engineering principles a process was evolved to effect the separation of a desired class of mineral from materials naturally associated with it.

Chrysocolla was selected as a mineral concerning whose flotation little had been recorded, but which was of potential commercial importance by reason of its presence in large quantities in virgin mineralization and in tailings dumps already mined and ground.

On investigation of the chemical and physical properties of chrysocolla, $\text{CuSiO}_3 \cdot 2\text{H}_2\text{O}$, it was found that its structure was based on linked metasilicate units, occurring either in/ chains or as $(\text{SiO}_3)^{2n-}_n$ closed ions. These structures were loosely bound together by copper atoms occurring with six-coordination numbers satisfied by the unshared oxygen atoms in the metasilicate units.

In a search of the chemical literature for means of attaching compounds with hydrophobic properties to specific metallic ions, it was found that chelate forming compounds possessed interesting possibilities. At this stage the class of ortho-nitroso-para-alkyl phenols was investigated and it was decided to investigate them as flotation agents. Several investigators had reported that they found these phenols to form stable chelate or inner complexes with copper ions.

Synthesis of these compounds was undertaken. Due to difficulty of their purification, the synthetic program was shifted to the monoalkyl resorcinol ethers, which were prepared and nitrosated to yield compounds having the originally desired chelate and hydrophobic properties.

The nitroso resorcinol ethers synthesized, together with the corresponding 4-alkyl nitroso resorcinols, were tested as flotation agents for chrysocolla in synthetic mixtures with Ottawa silica sand. These compounds were also tested on commercial Copper Queen ore, a mixed sulfide ore from Arizona, containing chrysocolla.

It was found that the compounds tested were specific flotation collectors for chrysocolla and Copper Queen ore. It was found that pH, collector concentration, chain length of the substituent, and fineness of material floated influenced the flotation from these minerals of copper.

A new gravity assistance effect in flotation processes which represents a new field for flotation investigations was noted.

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DEVELOPMENT OF A STATISTICAL ANALYZER FOR RANDOM WAVEFORMS

(Publication No. 4084)

Edward M. Lonsdale, Ph.D.
State University of Iowa, 1952

Introduction

The perfection of transducers and high gain electronic amplifiers has made available for study the electrical analogs of certain slightly-understood physical phenomena. In this category are included speech sounds, machined-surface profile records, air and water turbulence, and brain potentials. The electrical voltage representing these phenomena is a continuous, non-recurrent function of time having finite maximum and minimum values. Due to the lack of periodicity characterizing these phenomena, the usual mathematical description in terms of a Fourier frequency-amplitude spectrum, is not always successful and resort is commonly made to statistical methods of analysis.

One particular statistical method based on the cumulative distribution curve seems quite promising, especially when supplemented with the statistical study of the rate-of-change of the fluctuation. The author undertook the project on which this report is made, with the following purposes in mind.

- (1) To develop an electronic computer to be used in the statistical study of nonrecurrent time functions of voltage.
- (2) To use the computer in the study of synthetic fluctuations whose Fourier components were known.
- (3) To use the computer to study several naturally-occurring random waveforms.
- (4) To evaluate the statistical distribution method as to its ability to characterize random waveforms.

Explanation of Statistical Method

The mathematical plot of the fraction of time, t/T , that the fluctuating voltage is more than some value L , as a function of L , is one type of statistical description of the waveform. This plot, $F(L)$ vs. L , is the one forming the basis of this investigation.

Such a plot alone is not adequate to characterize the fluctuation. However, if the time-rate-of-change of the function is similarly analyzed, a second statistical plot is secured. Proceeding further, the second derivative of the voltage can be similarly treated. Results secured show that the three plots, $F(L)$ vs. L , $F(L')$ vs. L , and $F(L'')$ vs. L are adequate to characterize any of the fluctuations investigated.

Description of the Apparatus

The equipment is entirely electronic, assembled on two eight-by-fourteen inch chassis and employing two separate power supplies. The actual data for the curves is taken point-by-point from meter readings.

Calibration of signal levels is accomplished by employing a built-in attenuator with provisions for comparison of the unknown level with a standard signal.

Discussion of Results

From a study of the results secured with synthetic waveforms the following conclusions were drawn;

(1) The $F(L)$ curve is a sensitive indicator of the existence of an additional sinusoid in the presence of several others in a complex wave.

(2) The shape of the $F(L)$ curve is a function of the number, and relative amplitudes, of the individual sinusoidal signals composing the complex wave. The frequencies of the individual components have no influence on this distribution.

(3) The frequencies of the elements making up the complex wave have an all-important bearing on the shapes of the $F(L')$ and $F(L'')$ distributions.

The tests using naturally-occurring random waveforms such as "white" noise, rectified receiver noise, and microphone hiss showed the following to be true.

(1) The $F(L)$ vs. L distribution differs from one type of waveform to the next; hence it serves as a characterizing function.

(2) The $F(L')$ function is also dependent on the waveform from which it arises and varies widely from one voltage source to the next.

Conclusions

The computer is capable of distinguishing one random waveform from the next through the $F(L)$, $F(L')$ and $F(L'')$ distributions. It can be used in the study of the phenomena mentioned earlier and the results may lead to the formulation of new theories in these fields.

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SOME SOLUTIONS OF PROBLEMS IN PLANE ELASTICITY USING CURVILINEAR COORDINATES

(Publication No. 4007)

Karl Stark Pister, Ph.D.
University of Illinois, 1952

The idea of solving the equilibrium equations of plane elasticity by expressing the components of stress in terms of a single function was introduced by Airy in 1862. It was systematized by Michell, who showed in addition that by substituting the strains in terms of the stresses in the compatibility equation of strain the stress function must satisfy the biharmonic equation. This leads to the reduction of all plane problems to the integration of a single linear differential equation. In this work the stresses in terms of the Airy stress function are given by a general tensor equation. The use of the stress function is generalized for any plane, orthogonal coordinate system. It is found that considerable simplification results if isometric coordinates are employed. Accordingly, in this work that restriction is included. A general expression of the

compatibility equation is given. The geometry of the isometric, curvilinear coordinate system is determined by a conformal mapping of the rectangular, cartesian plane upon the curvilinear coordinate plane. For a given isometric coordinate system, the components of the metric tensor are expressible in terms of the mapping function.

It is frequently desirable to obtain stress functions that will leave the boundaries of a body free of shearing stress. This may be accomplished automatically if the principal stress trajectories in the body are chosen as the coordinate lines. The necessary restriction on the stress function for this case is discussed.

As an application of the preceding theory the pure flexure of a beam bounded by logarithmic spirals is discussed. It is found that all spiral beams may be specified by two dimensionless shape parameters. Stress distributions in a typical beam are shown. As limiting cases of the solution for a spiral beam, the pure flexure of a wedge acted upon by a moment at the vertex and the pure flexure of a sector of a circular ring are obtained.

General solutions for which coordinate lines are lines of principal stress in rectangular and isometric polar coordinates are presented. A number of solutions that are known by other methods appear as special cases. Some special solutions for which coordinate lines are lines of principal stress are also given. In particular, examples of stress distributions in hyperbolic and "doublet" coordinates are shown. It is further pointed out how to obtain distributions of pure shearing stress on lines making angles of 45° with the coordinate lines by proper choice of the stress function.

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FULLY PLASTIC RESISTANCE OF PRISMATIC MEMBERS SUBJECTED TO COMBINED TORSION AND BENDING

(Publication No. 4019)

Shou Ling Wang, Ph.D.
University of Illinois, 1952

The knowledge of the ultimate resistance of load-carrying members makes possible, among other considerations, the design of sound and economic structures beyond the elastic strength of their material. This investigation deals with prismatic members of perfectly plastic material whose entire section has yielded under the combined action of a torque and a bending moment applied at their ends. The Lévy-Mises stress-strain law and the Mises yield condition are used to describe its mechanical behavior in the plastic state.

The first part of the investigation contains a numerical solution for members of square cross section. It is based on the partial differential equation which defines the exact stress distribution on the

yielded section in terms of a stress function according to the assumptions made as stated concisely in the last paragraph. The numerical method of analysis involves the replacement of the differential equation by a set of finite-difference equations, the section being divided into a network of squares. The difficulty faced in carrying out this procedure lies in the fact that the differential equation contains singularities at the center of twist and along the axis of bending, thus yielding an insufficient number of difference equations for a given number of nodal points. By visualizing an elastic core of variable width on the axis of bending and always of infinitesimal thickness in the perpendicular direction shortly before the initiation of unrestricted plastic flow, the stress function in that region can be established from the elastic analysis. It is postulated that the stress condition will not change in the course of the ensuing flow. Then from the known boundary conditions, the difference equations can be solved by the iteration process for different ratios of the rates of twisting and bending and also for different widths of the fictitious elastic core, the latter indicating the strain path by which the fully plastic state is approached. The results in each case are revised to such an extent until no appreciable improvement is observed by further refining either the mesh length or the interpolation formulas for approximating the derivatives. After the stresses are determined at the nodal points, the limit loads, i.e., the torque and the bending moment which the square bar can sustain simultaneously, are calculated by means of numerical integration over the cross section.

The second part of the investigation consists of getting approximate solutions for members of various cross sections based on the maximum plastic work principle formulated for this problem. An admissible state of stresses is conceived from the idea of a modified sand-heap analogy by considering the surface of the stress function over the cross section as that of a sand-heap which, instead of having a definite gradient as in the case of plastic torsion, has a variable gradient depending on the relative rates of twisting and bending. By virtue of the variational principle, such a state of stresses would represent an approximate solution on the conservative side. The interaction curves thus found are simply elliptical arcs irrespective of the shape of the cross section. The same results can be derived for some special sections by applying the Rayleigh-Ritz Method to the variational principle, but its success is rather limited.

It is encouraging to note that the interaction curve obtained from the idea of modified sand-heap analogy shows excellent agreement with the numerical solution which is based on a more rigorous analysis for the case of square cross section. The adequacy of the new technique is further evidenced by the fact that theoretically it gives the exact solution for thin wall tubes.

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MATHEMATICS

IDEAL LATTICES AND THE STRUCTURE OF RINGS

(Publication No. 4048)

Robert L. Blair, Ph.D.
State University of Iowa, 1952

It is well known that the set of all ideals of a ring forms a complete modular lattice with respect to set inclusion. The same is true of the set of all right ideals. Our purpose in this paper is to consider the consequences of imposing certain additional restrictions on these ideal lattices. We adopt the following terminology: A ring A is said to satisfy condition C or D (C_r or D_r) in case the lattice of ideals (right ideals) of A is complemented or distributive, respectively. The following are typical results. A ring A which is semi-simple in Jacobson's sense (Amer. J. Math. vol 67 (1945) pp. 300-320) satisfies condition C (C_r) if and only if A is isomorphic with the discrete direct sum of simple rings (of simple rings with minimal right ideals). If a ring A satisfies condition C_r , then $A = M \dot{+} M^*$, where M is the maximal regular ideal of A (Brown and McCoy, Proceedings of the American Mathematical Society vol. 1 (1950) pp. 165-171) and M^* is the annihilator of M . The rings M and M^* satisfy condition C_r and M^* is bound to its radical (M. Hall, Trans. Amer. Math. Soc. vol. 48 (1940) pp. 391-404) which is nilpotent of index two. An ideal (right ideal) I of a ring A is strongly irreducible in case $B \cap C \subseteq I$ for ideals (right ideals) B, C of A implies that $B \subseteq I$ or $C \subseteq I$. (Cf. L. Fuchs, Comment. Math. Helv. vol. 23 (1949) pp. 334-341.) A ring A satisfies condition D (D_r) if and only if each ideal (right ideal) of A is the intersection of all strongly irreducible ideals (right ideals) containing it. Finally, if A is semi-simple and satisfies condition D_r , then A is isomorphic with a subdirect sum of division rings.

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THE THEORY OF ANALYTIC FUNCTIONS IN BANACH ALGEBRAS

(Publication No. 4161)

Edward Kenneth Blum, Ph.D.
Columbia University, 1952

The primary objective of this research is to extend the classical theory of analytic functions of a complex variable to functions which have for their domains and ranges subsets of an abstract Banach algebra. We limit the discussion to commutative B -algebras with unit.

A function defined in a region D of a B -algebra B is differentiable at a point x in D if there exists an element $f'(x)$ in B such that for any $\epsilon > 0$ there is a $\delta > 0$ such that $\|f(x+h) - f(x) - hf'(x)\| < \epsilon \|h\|$

whenever $\|h\| < \delta$. The function is analytic in D if it is differentiable at all points in D .

The integral of $f(x)$ along a path is defined in the usual way and the elementary properties of integrals are obtained. The Cauchy Integral Theorem is then proven on a closed curve in a convex region. This is then generalized to any curve which is homotopic to a point in the region of analyticity.

The Cauchy formula is obtained and shown to represent the function at least in the largest sphere contained in the region of analyticity. The theory of power series is developed with a distinction between two types of convergence. The Taylor expansion is then obtained from the Cauchy formula and is shown to represent the function at least in the largest sphere in the region of analyticity.

The identity theorem is obtained for analytic functions which are equal at all points in a region. The concept of analytic continuation is introduced and with it, multiple-valued functions and singularities. Here there are major departures from the classical theory. The complete theory of the logarithm is obtained by proving that the fundamental group of the principal component of the set of regular elements is isomorphic to the group (additive) consisting of all elements b in B such that $\exp(b) = e$, the unit element. This also gives the theory of the analytic function $x^{1/m}$, m a positive integer.

The Laurent expansion is obtained for a function analytic in a set of the form $\{z + \lambda e, 0 \leq r_1 < |\lambda| < r_2\}$. The problem of analytic continuation is discussed, it being shown that continuation is possible at least into the set $Q = \bigcap Q_m$, where Q_m is the set of elements x such that the spectrum of x lies in the annulus of inner radius r_1 and outer radius r_2 for each maximal ideal M .

Some theorems on the behavior of a function in the neighborhood of a singularity are then obtained. It is shown that a plane singularity of a single-valued analytic function cannot be isolated if the set of regular elements is dense in B and the radical of B is O . With these same conditions, the behavior in the neighborhood of a pole is shown to be the same as in the classical theory. The Weierstrass theorem for essential singularities does not hold in general.

Some ad hoc results on polynomials over a B -algebra are obtained, among them being the proof that the metric behavior differs from the classical theory.

Finally, the theory of rational functions is developed in part with particular attention to singularities and residues.

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EFFECT OF THE STUDY OF SOLID GEOMETRY ON CERTAIN ASPECTS OF SPACE PERCEPTION ABILITIES

(Publication No. 4234)

Ernest Raymond Ranucci, Ph.D.
Columbia University, 1952

Teachers of solid geometry and educators whose influence is felt in the formulation of courses of study in mathematics have long worked on the assumption that study of the subject will improve space perception abilities. This term is being used to designate the abilities involved in handling problems that are spatial in nature. The general feeling seems to be that a field like solid geometry which deals with materials where two and three dimensional relationships are so important should develop such abilities if such abilities are developable. This research seeks to answer one question:

Does the study of solid geometry affect space perception abilities as measured by certain tests?

Psychologists are in agreement that certain space factors are present in tasks requiring the manipulation of visual patterns. Although there is no unanimity as to the precise definition of these space factors, points of agreement have been reached.

There is a factor which depends upon the ability to recognize objects when viewed from different positions; another involves the sensing of mirrored or reversed relationships; another factor depends on the body orientation of the observer; another depends upon the ability to imagine movement within a given configuration.

A battery of tests designed to measure certain aspects of space perception abilities was administered to groups of seniors in eleven high schools. Some of the groups were about to begin a course in solid geometry; others were not taking the course. The groups had previously studied two years of algebra and one year of plane geometry. Five months later the battery of tests was readministered to both groups. Comparisons were made between the original test scores and the re-test scores, and statistical procedures were undertaken to find out whether or not the study of solid geometry had affected the performance of the Solid Geometry group on these tests. Presumably the battery of tests was measuring aspects of space perception abilities.

The Solid Geometry group achieved mean gains of 7.14, 5.02, 3.49, and 12.22 points, respectively, in the battery of four space perception tests. The Control group achieved mean gains of 7.75, 6.47, 4.29 and 12.90 points.

A "t" test was made to find out whether the difference in means of the two groups on the original administrations of the tests was significant. The test indicated that the Solid Geometry group was superior to the Control group in certain aspects of space perception abilities. For this reason superiority of the Control group in mean gain might not be significant.

Further statistical tests were considered in which as many matched pairs as possible were chosen from the experimental and control groups. In the first of

the tests with matched pairs, subjects were matched by sex, I.Q., background of mechanical drawing and school. The Sign Test was made for these matched pairs and results checked by application of the Paired Replicates Test. In the second of the tests with matched pairs, subjects were matched only by the average of the scores on the first and second administrations of the tests in the battery. The Sign Test and Paired Replicates Test were also used on the matched pairs obtained by the second method of selection.

The level of significance selected in all cases was .05.

In no case did the improvement in scores give any indication that the Solid Geometry group had improved in certain aspects of space perception abilities beyond the limits of normal expectation. The Control group, which was not studying solid geometry, performed on the second administration of the battery of space tests about as well as did the Solid Geometry group.

Conclusions

1. The claim of many that the study of solid geometry will improve space perception abilities, in so far as the factors measured by the four tests are concerned, has little statistical backing. The mean gains achieved by the Solid Geometry group were less than those achieved by the Control group.

2. By matching procedures in the statistical analysis it was demonstrated that this lack of superiority of the Solid Geometry group cannot be attributed to:

a. Extraneous conditions such as I.Q., mechanical drawing experience or mathematical background.

b. Initially higher means of the Solid Geometry group on three of the four tests.

3. If the improvement of space perception ability, as evidenced by performance on the battery of tests administered, is deemed to be one of the important outcomes of teaching solid geometry, this aim is not being met.

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LINEAR MANIFOLDS AND THEIR LOGICAL COMPLEMENTS IN HILBERT SPACE

(Publication No. 4115)

Howard Henry Wicke, Ph.D.
State University of Iowa, 1952

This thesis is part of a study of topological aspects of separable Hilbert space. The discussion is limited to properties, both topological and algebraic, of linear manifolds and their logical complements. The emphasis has been placed on linear manifolds which are not closed. The first two chapters present some classical results in the notation

used throughout. In Chapter III we apply the theorem of Banach to obtain among other results that the least manifold containing an analytic set is of the first category or is the entire space. We show that a not closed linear manifold is not homeomorphic to H . A class of linear manifolds called Euclidean W -spaces is discussed next. These manifolds may be thought of as the least manifold containing an infinite orthonormal set. A result here is that the Hilbert space is the uncountable union of everywhere dense Euclidean W -spaces which have only the zero element in common. In Chapter IV some properties of projections of one closed manifold on another are developed and the relation of these properties to the closure of the vector sum of two linear manifolds is brought out. This discussion leads to a classification of linear manifolds which are not closed. This classification is an extension of the classification of Dixmier of the "varieties J ." These manifolds are classified into three classes according to whether they contain a closed linear manifold of infinite dimension (an H -manifold) or not, and, in case they do contain such a manifold, whether or not it is maximal in a certain sense. The subject of Chapter V is a class of manifolds called singular manifolds: those linear manifolds which are not closed which do not contain an H -manifold. A typical result is that those singular manifolds which are the countable unions of locally compact linear sets are either of finite dimension or Euclidean W -spaces. Chapter VI deals with logical complements of linear manifolds. We find, among other properties, that these sets, if non-empty, are everywhere dense, of the second category, connected and locally connected, and not locally compact.

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PHYSICS

RELATIVE STOPPING POWERS OF DIFFERENT MATERIALS FOR ELECTRONS

(Publication No. 4156)

Norman Arthur Baily, Ph.D.
Columbia University, 1952

The stopping power of different materials for electrons of different energies relative to air is needed for the solution of many practical problems. Experiments have been carried out using the beta rays of S^{35} and P^{32} , representing widely different ranges of electron energies, and materials containing elements of different atomic numbers.

The experimental method used involves only quantities that can be measured, or are known, with good accuracy. The experimental conditions were carefully adjusted to meet the requirements of the Bragg-Gray principle. Under these conditions it

can be shown that the average relative mass stopping power of a material with respect to air for the beta rays of an isotope uniformly distributed in the material is

$$\bar{S} = \frac{N \bar{E}}{N_i W}$$

where N = number of electrons emitted per second per gram of material

\bar{E} = average energy per electron

N_i = number of ion pairs produced per second per gram of air

W = average energy lost by an electron per ion pair produced in air

The four quantities on the right of the equation have been determined accurately using S^{35} and P^{32} as the sources of beta rays and the following materials: Water, potassium sulphate, potassium phosphate, lead sulphate, lead phosphate.

Values of \bar{S} have been calculated according to the Bethe-Bloch theory, under the conditions of the experimental determinations. Comparison of the experimental and theoretical results is shown in Tables 7 and 8 of the text. It will be seen that the agreement is not very good. Since the error in the experimental values cannot be greater than a few per cent, it appears that stopping power theory requires further investigation.

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A STUDY OF THE MECHANISM OF MASS TRANSFER IN CATHODE FILMS DURING ELECTRODEPOSITION

(Publication No. 4224)

Robert Rae Banks, Ph.D.
Columbia University, 1950

A study was made of the mechanism of mass transfer during electrolysis. The cells were constructed with the cathode at the top and the anode at the bottom of a vertical 20 mm I.D. glass tube so that mass transfer by convection would be eliminated. By this expedient the movement of ions throughout the cell is due solely to the effects of diffusion and transport. More conventional types of cells depend on mass transfer by convection and agitation for transfer of matter in the bulk of the solution, with diffusion and electrolytic transport becoming the principal factors in the stagnant film surrounding the electrodes. By use of the vertical cells the electrolyte film was expanded from about 0.05 cm., which is the average thickness with convection, to 12 cm. This thickness permitted the chemical composition to be determined at several points within the film. Potential gradients were also measured throughout the cell.

On the basis of these measurements a theory was developed which explains the results of the

experimental work and other phenomena previously observed in electroplating.

A method was developed to determine the composition of the closest layer of electrolyte adjacent to the electrode which is free to flow. These data help to establish the shape of the concentration gradient curves, and in addition, give the closest approximation to the composition of the solution from which deposition takes place which has so far been reported. In the case studied, fine grained copper deposits were obtained from a solution in which copper could not be detected chemically in the layer adjacent to the cathode.

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A PHOTOGRAPHIC STUDY OF THE $\pi^+ \rightarrow \mu^+ \rightarrow \beta^+$ DECAY SEQUENCE

(Publication No. 4162)

Herbert Jerome Bramson, Ph.D.
Columbia University, 1952

The differential energy spectrum from 200 positrons emitted in $\pi^+ \rightarrow \mu^+ \rightarrow \beta^+$ decay has been investigated using multiple scattering measurements. The spectrum exhibits a sharp maximum and is most consistent with a finite cutoff at the high energy end. A comparison of the experimental data has been made with the Michel theory of muon decay. The results of this theory employing a general linear combination of the five invariants used in β decay theory are summarized by the equation

$$4E^2 \{ 3(W - E) + 2 \rho (4E - 3W)/3 \} / W^4.$$

From this, a value of $\rho = 0.29 \pm 0.18$ is obtained. Four anomalously short muon ranges have been observed in a study of 3300 $\pi \rightarrow \mu$ decays. Only one is consistent with the unique decay energy of a pion in flight. That the β particles are truly positrons is confirmed by their observed annihilation.

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THE SUPERCONDUCTING PROPERTIES OF COLUMBIUM

(Publication No. 4255)

Donald Bowker Cook, Ph.D.
Columbia University, 1950

Isothermal critical magnetic field curves and zero field transitions have been measured for several annealed specimens of columbium by means of an a.c. mutual inductance method. Measurements were made in the temperature region between 5.0°K and the zero field transition temperature, 8.65°K, using a charcoal desorption cryostat and helium gas

thermometry. The observed H-T curve fitted the usual parabolic relationship $H = H_0 (1 - T^2/T_0^2)$ with $H_0 = 8050$ oersteds and $T_0 = 8.71^\circ \text{K}$. The initial slope of the H-T curve was 1850 oersteds/deg. The electronic specific heat in the normal state calculated from thermodynamic equations is $0.0352 T$ and the approximate Debye characteristic temperature in the superconducting state is 69°K . Results on a specimen of columbium with a tantalum impurity of 0.4% according to slow neutron scattering measurements were in agreement with the data obtained from columbium of 0.2% maximum tantalum impurity.

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COLOR CENTERS AND TRAPPED CHARGE IN ALKALI HALIDE CRYSTALS

(Publication No. 3996)

David Bellamy Dutton, Ph.D.
University of Illinois, 1952

This investigation deals with the effects of X-ray bombardment at low temperatures on the electrical and optical properties of KBr and KCl crystals. The bombardment produces lattice defects analogous to the "Farbzentren" or color centers^{1,2}, each characterized by an optical absorption band. One such lattice defect, that responsible for the "V₁" absorption band^{3,4}, may be a positive-ion vacancy with a trapped hole (i.e. a lattice site at which an alkali-metal atom is missing)⁵. The V₁-band, obtained by X-raying at liquid-nitrogen temperature, is bleached by warming to temperatures much above this range.

Crystals of KCl and KBr were exposed to X-rays at -180°C and were then warmed to room temperature with an electric field applied. The conductivity of the crystals was found to be temporarily enhanced by the thermal release of mobile charge simultaneously with the disappearance of the V₁-band, indicating, on the basis of the above model, the release of trapped holes. The release of charge was also observed from F'-centers^{1,2} and from other charge traps whose nature is not yet understood, such as the center responsible for the V₄ absorption band.⁴ Luminescence accompanies the release of charge in each case.

R. W. Pohl, Proc. Phys. Soc. London **49**, 3 (1937)

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ON THE MOTION OF VACANCIES IN A ONE-DIMENSIONAL HOMOGENEOUS LATTICE

(Publication No. 3973)

Yü-Chang Hsieh, Ph.D.
Vanderbilt University, 1951

In a one-dimensional crystal lattice with a vacancy, the potential energy of an atom next to the vacancy must be of the type of a potential barrier separating two equivalent potential wells from each other. The solutions of the Schrödinger equation corresponding to this double-well potential give information about the lattice spacing, the linear compressibility, and the coefficient of diffusion of the vacancies.

A mathematical expression for this kind of potential function is chosen as

$$x^2 V(x) = (\lambda \cosh 2ax - 2a)^2, \quad k^2 = \frac{2m}{\hbar^2},$$

where a and λ are constant parameters.

Only the two lowest eigenfunctions of the stationary wave equation for the atom can be written in closed form. They are

$$\psi_1 = \cosh ax \cdot e^{-\frac{\lambda}{2a} \cosh 2ax},$$

$$\text{and } \psi_2 = \sinh ax \cdot e^{-\frac{\lambda}{2a} \cosh 2ax},$$

with the condition that $\lambda/a \leq 1/6$.

Initially, the vacancy is on one side of the middle hump and the atom is on the other side of the middle hump of the potential function. The atom can be represented by a wave packet in the usual way. The normalized wave packet is

$$\psi = \sqrt{\frac{a}{K_1(\frac{\lambda}{a})}} e^{-ax - \frac{\lambda}{2a} \cosh 2ax},$$

where $K_n(x)$ is the modified Bessel function of the second kind. The time in which an atom with the energy given by the above expression will have jumped to the vacant site is $k^2 \hbar / 8a\lambda$.

The potential function for which the foregoing wave packet is an eigenfunction is

$$k^2 V_S(x) = (\lambda \cosh 2ax - 2a)^2 + 2a\lambda e^{2ax} - \frac{K_0(\frac{\lambda}{a})}{K_1(\frac{\lambda}{a})} \cdot 2a\lambda.$$

This is approximately the potential function for an atom in the perfect lattice. An atom which was initially in the single-well potential V_S , is in the double-well potential V after the sudden removal of its neighboring atom.

From the position of largest value of ψ , one can find the interatomic space δ as $(1/a) \ln(2a/\lambda)$. With the aid of V_S , the linear compressibility K of a

perfect crystal is given by $(4a^3\lambda/9k^2\delta) \exp(a\delta)$. From the known data on the compressibility, the Young's modulus, and the lattice spacing for single copper crystals, an estimate of the order of magnitude of a and λ has been made.

The coefficient of diffusion of the vacancies, D_h , has also been estimated. Numerical evaluation at different temperatures shows that D_h is not very sensitive to temperature. This may suggest that at low temperatures, the "vacancy" mechanism is the only important process in diffusion. The decision about the exact mechanism of the self-diffusion process depends not only upon a theoretical calculation of the concentration of vacancies present in the crystal, but also upon more experimental data.

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EXCITATION FUNCTION FOR
CHARGED π MESON PRODUCTION IN
HYDROGEN AND CARBON BY
345-380 MEV PROTONS

(Publication No. 4229)

Sidney Passman, Ph.D.
and Martin M. Block
Columbia University, 1952

The excitation function for charged meson production in hydrogen and carbon is measured for incident proton energies 345 to 380 Mev. For hydrogen, the $90^\circ \pi^+$ meson production energy spectra occur as peaks in the energy region predicted from kinematics of the reaction $P + P \rightarrow \pi^+ + D$. Ratios of these $90^\circ \pi^+$ differential cross sections are $(\frac{d\sigma}{dw})$ at 380 Mev: $(\frac{d\sigma}{dw})$ at 365 Mev: $(\frac{d\sigma}{dw})$ at 345 Mev = 2.6 : 1.6 : 1, with a statistical uncertainty of 15%.

For carbon the π^+ meson production spectra show an increase in the modal energies with increasing incident proton energy. The $(\frac{\pi^+}{\pi^-})$ ratio in carbon is found to be in the range $(10 \pm 3) : 1$ for all three proton energies studied.

Qualitative agreement with these carbon π^+ meson spectra is obtained using a phenomenological analysis based upon the assumptions of nucleon-nucleon collisions in which the target nucleus has a gaussian momentum distribution.

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ENERGY SPECTRA AND ANGULAR
DISTRIBUTIONS OF PHOTONEUTRONS
FROM HEAVY NUCLEI

(Publication No. 4009)

Glenn Albert Price, Ph.D.
University of Illinois, 1952

The energy spectra of photoneutrons from the absorption of 22 mev bremsstrahlung by silver and bismuth have been measured with nuclear emulsions. Comparisons are made between the observed photoneutron spectra and those predicted on the basis of a statistical nuclear model. Energy level densities, $w_r(\epsilon)$, are assumed proportional to $e^{\sqrt{a\epsilon}}$ and $\ln(\frac{A}{20}\epsilon + 1)$ where ϵ is the excitation energy of the residual nucleus. The exponential form of the energy level density is in better agreement with the data than is the logarithmic form. However, for neutron energies greater than 4 mev there are more photoneutrons observed than predicted by the exponential energy level density scheme.

The angular distributions of photoneutrons from several elements have been measured with a variety of neutron detectors. The moderated neutron detector, which is equally sensitive to neutrons of most energies, indicates the photoneutron flux to be predominately isotropic. The small anisotropic component has a maximum at 90 degrees to the x-ray beam. Photoneutrons from bismuth have a larger anisotropic component than photoneutrons from any other element which was tested. In that case 21% of the neutron flux is in the anisotropic component.

The $A1(n,p)$ and $Si(n,p)$ reactions have been used to measure the angular distributions of photoneutrons from several elements. These reactions have thresholds at 1.95 mev and 2.69 mev respectively and are primarily sensitive to neutrons with more than 4 mev. energy. The angular distributions thus observed have a maximum at 90 degrees to the x-ray beam. In general, photoneutrons from the heavy elements deviate more from isotropy than do the light elements.

An epithermal neutron detector indicates that the low energy photoneutrons are emitted isotropically.

It is concluded that most photoneutrons are generated in a manner consistent with the statistical nuclear model. The high energy photoneutrons, which constitute a small fraction of the total photoneutron flux, are ejected predominately at right angles to the x-ray beam as expected by dipole absorption of the photons.

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A MULTICHANNEL GAMMA RAY SCINTILLATION SPECTROMETER AND THE RADIATIONS FROM Zr^{89}

(Publication No. 4013)

Ferdinand John Shore, Jr., Ph.D.
University of Illinois, 1952

A multichannel gamma-ray scintillation spectrometer is described, and data are presented from which the decay scheme of Zr^{89} is derived. The scintillation spectrometer employs a single NaI (Tl) crystal, housed in a MgO-lined Al-reflector unit, and it is used in conjunction with a type 5819 photomultiplier tube and a very well regulated power supply. The output pulses are linearly amplified, and a differential pulse-height spectrum is obtained with a 10-channel pulse-height discriminator which is based on a cathode ray tube. Ten separate light-pipes are placed at uniform spatial intervals close to the cathode ray tube screen. Light from the screen, which enters a given light-pipe, is brought to the associated 931A photomultiplier tube and the electrical pulse which the 931A tube emits actuates a scale-of-ten and mechanical register. Prior to presentation on the cathode ray tube screen the input pulses are made flat topped, with the amplitude of the shaped pulses proportional to the input-pulse amplitudes. A delayed intensification gate is applied to the cathode ray tube grid so that the beam current is turned on only during a fraction of the time the displacement of the beam is a maximum. Using this discriminator a typical channel profile is found to be essentially a rectangle, with triangular wings representing only a few per cent of the total acceptance window. Typical operation is with a channel acceptance window about 0.7 the average separation between channel centers. By depressing the quiescent spot position, data may be obtained on pulse distributions spread over 35 contiguous acceptance windows. A serious problem is stability of the channel widths which vary by amounts of the order of 1 per cent per hour. Monitoring and minor readjustments every few hours allow data to be taken reliably so that relative intensity estimates may be made of two or more gamma-rays. The energy calibration of the system is much more stable.

In the study of the radiations from Zr^{89} , which were prepared in the 22 Mev betatron by means of the probe technique, there were employed, in addition to the gamma-ray scintillation spectrometer, two beta-ray spectrometers, a 180° type and a 255° double focusing type. Scintillation-counter coincidence apparatus was also utilized. The 4.4-minute state in Zr^{89} decays by means of a 588-keV gamma-ray, a 2.4-Mev positron group to the ground state of Y^{89} , and by means of a particle group of approximately 870 keV which is in coincidence with a 1530-keV gamma-ray thought to occur in Y^{89} . The intensities of the 4.4-minute positrons relative to the 588-keV gamma-rays are such that the log ft values are 4.2 ± 0.2 and 6.7 ± 0.3 respectively for the 870 and 2,400-keV transitions. The decay scheme is such that the Zr^{89m} state has a term value of $p_{1/2} -$

on the basis of the Zr^{89} ground state being $g_{9/2} +$ and from the assignment of the 588-keV gamma-ray transition as M4 radiation. The 1530-keV state in Y^{89} is thought to be a $p_{3/2} -$ state on assuming the 870-keV transition to be allowed, $\log ft = 4.2$, and from considering the proton-neutron transformation to be a single nucleon change using the shell model of Mayer. This, however, makes the matrix element for the $p_{1/2} - p_{3/2}$ transition 600 times smaller than for the $p_{1/2} - p_{1/2}$ transition. Similar anomalous behavior has been noted recently by Mann and Axel in the case of Y^{87} , and by Sunyar and co-workers in the case of Kr^{85} . For the two M4 isomers, the 912-keV gamma-ray in Y^{89} and the 588-keV gamma-ray in Zr^{89} , the $K/(L + M + N)$ conversion electron ratios are respectively 7 ± 2 and 5.4 ± 0.7 .

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THE RAMAN SPECTRUM, STRUCTURE, FORCE CONSTANTS AND THERMODYNAMIC PROPERTIES OF BROMINE PENTAFLUORIDE

(Publication No. 3978)

Charles V. Stephenson, II, Ph.D.
Vanderbilt University, 1952

The published literature contains very little information about bromine pentafluoride, consisting mostly of methods of preparation and observed chemical reactions. Bromine pentafluoride is one of the most chemically active compounds known. This extreme chemical activity has prevented all but the simplest physical measurements on this molecule. However, the recent development of the plastic polychlorotrifluoroethylene, known commercially as fluorothene or Kel-F, made the spectroscopic study of this compound possible. The research reported in this thesis involves a study of the Raman spectrum of bromine pentafluoride, the assignment of a structure and the calculation of force constants and thermodynamic properties for the molecule.

The Raman tube used in this investigation was constructed of fluorothene plastic. A relatively pure sample of BrF_5 was transferred into the Raman tube by a distillation process.

The Raman spectrum was obtained on a Hilger E 612 Raman spectrograph using the 4358A and 4047A lines of Hg as the parent lines. The spectrum contained nine lines at $683cm^{-1}$, $626cm^{-1}$, $572cm^{-1}$, $536cm^{-1}$, $481cm^{-1}$, $415cm^{-1}$, $365cm^{-1}$, $315cm^{-1}$ and $244cm^{-1}$. The polarization measurements became involved when it was found that fluorothene in its normal condition was a depolarizer. However, it was found that when the plastic was stretched slowly to 200% of its original length, it seemed to act as a uniaxial crystal. Thus, a Raman tube with a window made of the stretched plastic could be used, providing the direction of stretch of the plastic was parallel or perpendicular to the direction of the incident radiation. As a test, a polarization measurement of

the benzene spectrum clearly showed the polarization of the 992cm^{-1} and 3062cm^{-1} lines. Polarization measurements of the bromine pentafluoride spectrum showed definite polarization of the 683cm^{-1} , 572cm^{-1} and 365cm^{-1} lines.

The Raman spectrum and partial infrared spectrum interpreted with the help of the selection rules of the various possible structures of the molecule, indicated that the symmetry of bromine pentafluoride was that of a tetragonal pyramid (C_{4v}). Frequency assignments were made on the basis of this structural assignment.

The calculation of force constants and thermodynamic properties of the molecule required a more detailed knowledge of the structure of the molecule than just the symmetry group to which the molecule belonged. In the absence of any available data of the molecular dimensions, it was assumed that the five Br-F bond distances were equal to the sum of the single covalent bond radii of bromine and fluorine and that the bromine atom was at the center of mass. The molecular dimensions and moments of inertia were calculated by the use of these assumptions.

A normal-coordinate treatment was carried out by the use of the Wilson FG matrix method. The most general quadratic potential function for bromine pentafluoride could not be used since it contained nineteen force constants and only nine could be solved for uniquely. Therefore, a modified valence-type potential function was assumed. This potential function contained the nine force constants which were thought to be the most important. The force constants calculated in this way were reasonable and the Br-F stretching force constants agreed reasonably well with the values predicted by Badger's rule, Gordy's rule and the value obtained from the diatomic molecule BrF.

The thermodynamic properties of bromine pentafluoride were calculated from its boiling point at 313.7°K to 1500°K . The usual harmonic-oscillator, rigid-rotator approximations were assumed. There were no experimental data to compare with these values.

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THE VANDERBILT BETA-RAY SPECTROMETER AND THE RADIOACTIVE DECAY OF TIN 113

(Publication No. 3979)

Dan Anderson Thomas, Ph.D.
Vanderbilt University, 1952

A beta-ray spectrometer using two thin magnetic electron lenses has been constructed by the beta-ray spectroscopy group at Vanderbilt University. The spectrometer is designed to permit the study of electron spectra involving both low and relatively high energies in the same spectrum, and to permit

the use of the large-area radioactive sources necessary for weak activities.

The main features of the spectrometer are the magnetic lens, a vacuum chamber having a source mount at one end and an end-window Geiger counter at the other end, and a baffle system to limit the electron trajectories to certain allowed paths. The accessories include an oil diffusion pump with a mechanical fore-pump to maintain the vacuum, an ionization gauge and a Pirani gauge to measure the pressure, a Geiger counter filling system, a high voltage supply for the counter, a scaling and recording system for the counter output, an electric current electrons, emitted as the holes in the orbits are filled, provide some information, however, and under certain circumstances this information may give the decay scheme and the disintegration energy.

The ratio of the number of K-shell Auger electrons to the number of internal conversion electrons from the 390 Kev transition was determined experimentally to be 0.59 ± 0.02 . This ratio can be calculated independently of this measurement by the use of several experimental results from the literature in combination with a theoretical value for the ratio of the amount of L capture to the amount of K capture. If the experimental ratio of K Auger electrons to conversion electrons is appreciably smaller than the calculated value, an abnormally large proportion of L capture is indicated.

According to existing theory an excessive amount of L capture occurs when a very low disintegration energy is involved in the capture. The theory allows the computation of this low disintegration energy when the ratio of L capture to K capture is known.

An uncertainty in the value of the Auger yield of indium results in a large uncertainty in the calculated value for the ratio of K Auger electrons to conversion electrons. Certain limits are assumed for the Auger yield control circuit for the field coils, and a coil system to compensate for the earth's magnetic field.

The thinnest Geiger counter tube window made and used permitted the passage of some 3 Kev electrons and almost all 20 Kev electrons. The window was made of Nylon backed with a Lectromesh grid, and was 18 $\mu\text{g}/\text{cm}^2$ thick.

The spectrometer is designed to use field currents from 0.2 amperes to 25 amperes. A current control system was developed which sets the values of the field currents within this range and controls these currents to within a few tenths of one per cent.

About one-third of this thesis consists of a description of the spectrometer and its accessories. The other two-thirds is a report on the first experimental study made with the spectrometer, a study of the radio-active decay of Sn^{113} .

Tin 113 decays to an excited state of indium 113 by the capture of an orbital electron. The indium atom then reaches its ground state by a 390 Kev, partially converted, gamma-ray transition. Since the only nuclear radiation given off by a pure orbital capture decay is an undetectable neutrino, information about orbital capture is relatively difficult to

obtain. The x-rays and Auger which allow the Sn^{113} study to be presented as an example of the use of this new method for the determination of disintegration energies for pure orbital capture decays which are followed by gamma-ray transitions. Disintegration energies have been reported for only two of the 72 reported isotopes of this kind.

The experimental measurement of several of the properties of the decay of Sn^{113} and the presentation of a new method for the determination of disintegration energies for certain orbital capture isotopes are the chief results of this study.

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FOURTH-ORDER RADIATIVE CORRECTIONS TO ATOMIC ENERGY LEVELS

(Publication No. 4251)

Joseph Weneser, Ph.D.
Columbia University, 1952

In this paper the fourth-order radiative corrections to the elastic scattering of an electron in the

field of a fixed potential are examined, using the Dyson S-matrix formulation of quantum electrodynamics. The result can be represented as an addition to the interaction energy density of the electron with the external potential:

$$-ie \bar{\psi}(x) \delta_{\mu} \psi(x) \square^2 / \hbar^2 A_{\mu}^e(x) [d^2/4\pi^2 (.52 \pm .21)]$$

plus the anomalous magnetic moment already known. The contributions that arise from the vacuum-polarization currents are omitted. This term calculated contributes to the level shift in a hydrogenic atom an energy of:

$$d^4 Z^4 / n^3 \text{ Ry } \delta_{l,0} [4/\pi^2 (.52 \pm .21)]$$

For the 2S level of hydrogen this is $0.24 \pm 0.10 \text{ Mc.}$

Microfilm copy of complete manuscript of 25 pages, \$1.00. Enlargements 6" x 8", 10¢ per page.

RELIGION

RELIGION

THE REIGN OF SOLOMON IN THE LIGHT OF BIBLICAL AND ARCHAEOLOGICAL DATA

(Publication No. 3971)

Marion Francis Christie, Ph.D.
Vanderbilt University, 1952

A potentially fruitful field of scholarship is that of correlating literary analysis and archaeological data for specific persons or periods in Hebrew history. This dissertation represents one area where such study is needed.

This study examines critically biblical and archaeological data for Solomon to answer the question: What were the distinctive features of the reign of Solomon and what bases do these features offer for his reputation?

I. Sources. Analysis of I Kings 1-11 reveals four editorial strata, the last two being priestly. The final redaction helps to explain differences between the Septuagint and the Masoretic Text. The second edition was made by Deuteronomists in Babylonia after Jehoiachin's release from prison (561 B.C.). The major redaction, also Deuteronomic, was made between the death of Josiah (609 B.C.) and the surrender of Jerusalem (597 B.C.). The sources used

by the first redactor were the historical narrative of II Samuel 9-20, I Kings 1-2; The Book of the Acts of Solomon (I Kings 11:43), the major source, based on court annals and popular legends; a prophetic narrative; the Temple Archives; the Book of Jashar; and an Israelite document giving administrative divisions of the kingdom.

II. Organization and Administration of Solomon's Government. Solomon borrowed from governmental systems of the Ancient Near East, notably Egypt and Mesopotamia. Archaeological data help in understanding functions of Solomon's officials. The political divisions of I Kings 4:8-19 relate to Israel, not to Judah.

III. Building Enterprises. Comparative archaeology clarifies the record concerning the Jerusalem temple and palace compounds, the basic architecture of which was Phoenician. The more plausible view concerning Millo ("filling") is that it constituted repairs of David's breach in the wall of Jerusalem. Excavations on the Hill of Ophel, disclosing parts of towers filling the breach, also reveal Solomonic wall construction; but it is possible that allusions to building of the wall refer to a wall joining new parts of Jerusalem to the Hill of Ophel. Remains of shrines for foreign gods have not been discovered. Archaeologists have discovered several garrison and store cities. Megiddo presents excellent examples of Solomonic building, other remains which have been found

at Hazor, Gezer, Tell-el-Hesi, and Taanach, though the latter two are not mentioned in the biblical record. Information supplementing biblical data comes from discoveries of copper mines in the Arabah, and smelting and shipping facilities at Ezion-geber. Such archaeological evidence helps in understanding not only building enterprises, but also governmental and economic policies.

IV. Commercial Enterprises. Archaeology clarifies and supplements the record of Solomon's trade in horses and chariots, activities of his navy, his mining and smelting industries. Solomon enslaved the Canaanites and many of the Israelites. Economic relations with other kings were profitable. Solomon brought temporary prosperity to his people at the expense of destroying democratic tradition.

V. International Relations. Solomon's international relations with Phoenicia, Egypt, and other nations were grandly conceived, but of small lasting good to his people.

VI. Solomon's Conception of Kingship. Against a background of conceptions of kingship in non-Israelite nations of the Ancient Near East and early Israel, it is apparent that Solomon regarded himself as a grand monarch and as special agent of Yahweh.

VII. The Solomon of Tradition. Biblical and extra-biblical traditions reveal favorable and unfavorable reactions to Solomon, who lends himself well to legend and speculation.

VIII. Evaluation of the Reign of Solomon. In the light of this study, Solomon appears to have been a selfish and vain despot, but perhaps this type of man, with his glowing personal weaknesses, has an appeal for historians and formulators of traditions.

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STUDY OF THE DOCTRINE OF ELECTION IN TANNAITIC LITERATURE

(Publication No. 4194)

Benjamin Wolf Helfgott, Ph.D.
Columbia University, 1952

The purpose of this study is to determine the effect of the Christian challenge on the Jewish concept of election in the early Tannaitic period and the reaction on the part of Rabbinic thinking toward that challenge. The difficulty in establishing a clear Rabbinic theological doctrine on this subject is due primarily to the fact that the Haggadah, our major source of information, has not been organized into a system of theology. With regard to our problem the difficulty is intensified by the lack of certainty in the identity of the allusions in the various passages in early Rabbinic literature that have usually been taken as references to Jesus, Paul or Christians. A careful examination of the object, occasion and major emphases of the Epistle of Paul to the Romans and relevant references in New

Testament and Patristic sources, reveal the importance of this challenge in the development of the Pauline churches, its effect upon Jewish Christian communities, as well as Paul's unsuccessful attempt to reconcile his doctrine of universal Christian salvation with the inherent Jewish claims of priority to the Messianic promises. The calamitous fall of Jerusalem and the destruction of the Temple in the year 70 served Christianity with astounding evidence of the rejection of the "old" Israel, and bolstered its claim of being the true Israel.

It appears evident that the Rabbis did not choose to engage in debate or open polemic with Christians, although we have occasionally observed that in some of the reported Tannaitic conversations with a Min, a Kopher, or a Gentile, the nature of the subject and the form of the argument clearly betray the opponent's Christian conviction. Our study of the social and religious background of the important Tannaim of the time shows that they were in a position to know of this challenge and respond to it accordingly, and our detailed examination of the extant utterances in the Tannaitic Midrashim regarding God's love for Israel, Israel's relation to the gentile world, the sanctity of the Law, the Sabbath and circumcision, shows that they may be better understood as the products of such indirect polemic.

Beginning with R. Jochanan B. Zaccai, the Rabbis stressed the divine calling of the Jew in Torah and love for mankind. They repudiated the alleged Scripture "proofs" of God's rejection of Israel, and equally denied that in the Jewish concept of election, God's choice was arbitrary. They refuted the antinomian implications in the Christian challenge by emphasizing repeatedly that the purpose and perpetuity of the election is that Israel may live a life of Torah. The Tannaitic Midrashim are replete with relentless affirmation of the permanent and irrevocable sanctity of Torah, the Sabbath and circumcision, and the Rabbis appear to have refuted the Christian doctrine of salvation with the concept of Olam Haba (Hereafter) which is promised to Israel and to all men who live a good and sinless life. Moreover, the Tannaitic expressions of that period regarding the election of Israel reveal the Rabbis' intense love for God and their belief that God is equally united with Israel with a passionate love.

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MYSTICISM AND REALISM IN THE PHILOSOPHICAL SYSTEMS OF NYĀYA-VAIŚEṢIKA, JAMES BISSETT PRATT, AND FRIEDRICH, BARON VON HÜGEL

(Publication No. 4219)

Edward Johnstone Machle, Ph.D.
Columbia University, 1952

The developing study of comparative philosophy makes the investigation of the relations between

philosophy and mysticism advisable. Recent investigations of the latter state or imply that it properly clothes itself in an idealistic and monistic philosophy. This thesis is a study of three philosophies — those of Nyāya-Vaiśeṣika, of James Bissett Pratt, and of Friedrich, Baron von Hügel — which claim to be, or give evidence of being, realistic, pluralistic, and yet mystical, to determine whether each is indeed so, and whether these elements prove to be compatible. It was hoped that some suggestions as to the relations of mysticism and philosophy generally would emerge.

Procedure was principally by examination and interpretation of all available primary sources, in translation in the case of the Hindu school, to see if certain criteria or marks of realism-pluralism and of mysticism were present. The criteria of realism used were: (1) the ontological priority of multiplicity over unity, (2) the reality of time, (3) the independence of mind enjoyed by objects, (4) the qualitative difference between knower and known. Marks of mysticism sought included: (1) belief in the attainability of immediate knowledge of the ineffable, or direct communion with the divine, and in the superiority of such knowledge or state to the ordinary; (2) affirmation that ultimate reality can be known to be love, bliss, or complete release; (3) practice or approval of "the mystic way"; (4) attainment or expectation of ecstasy; (5) the seeking of the theopathic state.

All three philosophies were shown substantially to fulfil the criteria of realism and pluralism, and to manifest a majority of the marks of mysticism. It was pointed out that the Nyāya-Vaiśeṣika interpretation of natural processes in terms of *adṛṣṭa* qualified the independence of material structures, and that the school failed to achieve an adequately unified value-system. Pratt's attraction to monism and his romantic treatment of the cosmos as the "body" of the "cosmic dancer" were shown to raise problems for his pluralism. Von Hügel's time-doctrine was shown to qualify his realism, and his myths of creation and incarnation to leave tensions, which however he readily accepted. In each case, these limitations were taken as insufficient to disestablish either realism or mysticism.

The last chapter reviewed these expositions, and answered affirmatively: a realistic pluralistic mystical philosophy is possible. Divergences between the Hindu school and the two Christians were pointed out, leading to the suggestions of two types of realistic mysticism, labelled *isolative* and *communitive* respectively, distinguishable by their rejection or acceptance of empirical aspects of the self as partaking of the ultimate mystical values. The difficulties attendant on each in dealing with the relations of time and eternity, the privileged ontological status accorded selves in mysticism, and the status of social relations were investigated, leading to conclusions that Nyāya-Vaiśeṣika avoids the problems by its sharp cleavage between the empirical and the transcendent, that Pratt wavers between realism and mysticism, and that von Hügel occasionally weakens

his realism, but maintains a pluralism of tensions that qualifies his mysticism.

An hypothesis was suggested for uniting these data, involving the assumption of two matrices of experience, expressible only in nature-myths and self-myths, which may be taken to be contraries (isolative mysticism) or mutually supporting (communitive mysticism), possibly in terms of the place of interpersonal love in the orientations of the mystic or his community. It was urged that this last kind of data would be useful for continuing the study of the interrelations of philosophy and mysticism.

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BASIC ISSUES IN THE FUNDAMENTALISM OF W. B. RILEY

(Publication No. 4088)

Robert Sheldon McBirnie, Ph.D.
State University of Iowa, 1952

A controversy developed in American Protestantism during the early part of the twentieth century. The parties in the dispute were called "modernists" or "liberals" and "fundamentalists." The issues that formed the points of dispute were products of new ideas coming out of the nineteenth century. These issues were, the "higher criticism," the "social gospel," and the theory of evolution. The liberals accepted these ideas and the fundamentalists opposed them because they felt their historic faith was imperilled. In 1910 a group of orthodox ministers and laymen published a twelve volume series on, *The Fundamentals*. More than three million copies of this set of books were given to the clergy of the country. Less than a decade passed before the fundamentalists realized that more positive action was necessary in order to stem the liberal tide. The person most responsible for organizing and directing the orthodox reactionary forces was William Bell Riley.

Riley's conservative home environment, classical college education, and orthodox seminary training, prepared him for his role as a fundamentalist leader. Added to these factors was his zest for debate and the characteristics of individualism that made him pursue his objectives despite all obstacles. His theological and doctrinal ideas reflect the orthodox pattern of belief in the Bible as the divinely inspired and inerrant Word of God, belief in the virgin birth and physical resurrection of Christ, and the substitutionary atonement of Christ on the cross for the sins of the world.

The first indication of Riley's determination to become a "defender of the faith" was evidenced in his founding of the World's Christian Fundamentals Association in 1919. Through this agency he attempted to unite the forces of American orthodoxy.

Riley promoted the cause of anti-evolution during the heat of the fundamentalist-modernist controversy

in the decade from 1919-1929. The theory of evolution was being taught in the schools of the country. The liberals, for the most part accepted the evolutionary hypothesis and openly supported the quest for knowledge. Furthermore, the question of evolution was a practical issue that could be fought out in the courts by seeking judicial interpretation of the law. The fundamentalists sought to rid the schools of the teaching of the theory of evolution by legislative action and at the same time to expose the modernists.

Riley founded the Anti-Evolution League of Minnesota in 1923, and was instrumental in founding the Anti-Evolution League of America. Beside these organizational efforts, he delivered sermons in behalf of the anti-evolution cause from his Minneapolis pulpit. He debated the subject across the country with university professors and ministers; and wrote voluminously on the subject.

One of the basic items in the fundamentalism of Riley, beside the question of anti-evolution, was his fight for the fundamentals. In addition to his labors as head of the World's Christian Fundamentals Association, he founded a Bible school in Minneapolis. This school was one of the factors responsible for the enduring strength of fundamentalism in Minnesota and the Northwest. He also ministered to one of the influential congregations in Minneapolis as pastor of the First Baptist Church for forty-four years. While laboring in this capacity he was active as an evangelist. The fruit of his pen during his ministry contributed more than ninety separate publications, with a combined total of over one million printed pieces in circulation before his death.

Another tenet supported by Riley was that of "social reform." In this respect he was active for a time as a member of a Civic League in Chicago. He opposed the "drink" and supported "good government" throughout his ministry.

The final area of activity that felt the force of Riley's devotion to orthodoxy was the Minnesota Baptist State Convention and the Northern Baptist Convention.

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THE THEOLOGY OF JOSEPH H. SMITH

(Publication No. 4103)

Delbert Roy Rose, Ph.D.
State University of Iowa, 1952

The central purpose of this study has been to gain an understanding of the theology of Joseph H. Smith (1855-1946), a product and promoter of a revivalistic movement which was organized in July, 1867, at Vineland, New Jersey, as the "National Camp Meeting Association for the Promotion of Holiness," but which is known today as the "National Holiness Association." Smith has been the most-widely recognized and respected expositor-evangelist of the movement.

Essential to an understanding of Smith's theology has been a skeletal view of the rise, progress, decline, and revival in American Methodism of the Wesleyan teaching on "Scriptural holiness," that is, "Christian perfection." A biographical study of Smith has been necessary to discover the type of Christianity which Smith labored to produce.

Since no official history of the National Holiness Association has been written this study has drawn heavily upon articles which have appeared in holiness periodicals, written by the foremost leaders in the Holiness Movement. To present the movement as nearly as one of its accredited leaders, such as Smith, would have done, has been the intent of this writer. Biographical data on Smith has been gleaned from various articles, written sermons, books, letters, official minutes, and personal interviews. First-hand study of Smith's published sermons, Biblical expositions, devotional writings, addresses, and other written articles has enabled the author to discover inductively what Smith derived from the New Testament as that "primitive Christianity" he sought to revive or establish within those areas of Protestantism in which he and his colleagues ministered.

Smith accepted the Methodistic formulation of Biblical teaching as most nearly representing New-Testament Christianity; he believed the Bible to be the only revealed authority for Christian faith; he accepted as valid Paul's claim to be the pattern Christian for all generations of believers; and he claimed that a New-Testament ministry must be evangelistic and that all Bible doctrines are directly or indirectly related to experimental Christianity.

Central to the whole "system" of his thought was the concept of holiness — holiness in God, in angels, in original man, in redeemed man, and in the society of the eternal future. Like John Wesley, Smith presented Christianity as fundamentally a religion of salvation from sin, experimentally available to all men by faith in Jesus Christ but to be successively appropriated as "justification," "sanctification," and "glorification." Denying that entire sanctification is received at the time of justification by faith, and declaring that it may be experienced before death, Smith's strong emphasis was upon the instantaneousness of entire sanctification (for the believer) by an act of faith and on the patient persistence in the attitude of faith for growth in grace (i.e., progression in holiness) subsequent to the crisis. He professed to have experienced this grace himself and to have seen unnumbered seekers at his altars entering into the same spiritual union with Christ.

He, with the founders of the National Holiness Association, believed that the mission of the church was first of all spiritual and that the by-products of a spiritualized and vitalized Christianity are social uplift and advance for individuals and institutions.

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THE JEWISH INSTITUTIONS OF SYNAGOGUE AND TEMPLE IN THE SYNOPTIC GOSPELS

(Publication No. 3976)

Sylvan David Schwartzman, Ph.D.
Vanderbilt University, 1952

This study presents a detailed investigation of the quantity, quality and nature of the synagogue and temple information possessed by the synoptic evangelists. An introductory chapter describes the study's objectives and methods of procedure, and four chapters apiece are devoted to the separate consideration of synoptic synagogue and temple material. Comparisons of the findings and general conclusions are offered in the tenth and final chapter.

Quantitative data is secured by gathering, analyzing and classifying all pertinent references. After the elimination of doubtful material, the remaining primary and secondary references are classified within five major categories: (1) mention of the institution, (2) special Jewish associations, (3) activities connected with the institution, (4) appurtenances, and (5) personnel.

The quality or "authenticity" of the material is determined through comparison of the references with information secured principally from contemporary rabbinical literature and, where necessary, archaeological and Hellenistic Jewish sources. The gospels are then compared in terms of the quantity, variety and quality of their synagogue and temple information. To facilitate the measurement of quality of references a special instrument, a "ratio of authenticity," is utilized.

The nature of synoptic synagogue-temple material is revealed through study of the gospels' general knowledge of the institutions, the distribution and form-structure of the references, and the tendencies shown by the various evangelists. From these findings a number of observations are made about the *sitz im leben* out of which the gospels emerged.

Comparison of the results obtained from the separate investigations of the two institutions produce eight major findings about the nature of synagogue-temple material. (1) Although there is considerably more temple than synagogue information, the synagogue material is of slightly higher quality. (2) Matthew and Luke show a significant degree of dependency upon Mark for their synagogue-temple material. (3) Only a small amount of temple material and practically no synagogue material originates from the common Q source. (4) Matthew and Luke contain rather large amounts of material of their own which compares favorably in quality with that of Mark but offers much wider variety. (5) None of the synoptics shows any overwhelming superiority in synagogue-temple information. (6) None of the evangelists shows more than a superficial knowledge of these institutions. (7) While Luke's synagogue material and Matthew's temple material are comparatively superior, Matthew's combined synagogue-temple information is of some what higher quality than that of the other synoptics.

(8) In the main, Matthew uses his synagogue-temple material for polemical purposes against Judaism and its leaders. Mark and Luke employ theirs to supply Jewish color to their accounts of Jesus' activities.

There are also six central findings concerning the evangelists and their *sitz im leben*. (1) None of the evangelists was Jewish. (2) All of them lived in the diaspora. (3) Mark, the earliest, wrote his gospel some time after 70 C.E. Matthew composed his somewhat later, and Luke even later than Matthew. (4) Mark lived in a totally gentile environment and composed his gospel for gentiles and gentile-Christians. (5) Matthew produced his work in an area in which a sizeable Jewish group offered vigorous opposition to the young church, and he directed it to Christians, many of whom were probably Jewish-Christians being swayed by Jewish propaganda. (6) Luke, who had some contacts with Jews but apparently faced little Jewish opposition, wrote his gospel for gentiles and gentile-Christians.

Significantly, the findings fail to disclose any real Jewishness of Matthew as generally maintained by New Testament scholarship. Instead, the study reveals that the extent of synagogue-temple information possessed by all the evangelists was strictly limited and that none of them had any intimate, personal acquaintanceship with the two Jewish institutions.

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FALSE PROPHETS IN THE OLD TESTAMENT

(Publication No. 3980)

Charles Everett Tilson, Ph.D.
Vanderbilt University, 1952

Following the Septuagint, which sometimes translates *nābî* by the Greek word for "false prophet," biblical scholarship has subsumed all prophetic opponents of the canonical prophets under this category, leaving the implication that the "true" and "false" prophets constituted two mutually exclusive prophetic orders. Edward Siegman, author of the most extensive study of the false prophets to date, presents the typical expression of this view in the conclusion: the canonical prophets were true because they were sent by Yahweh; the false prophets were false because they were not sent by Yahweh.

This study, adopting for its point of departure, von Rad's insistence that the validity of a prophet's claim to truth can be determined only on the basis of his contribution to high religion, undertakes a comparison of the two groups of prophets against this common standard, uncommitted to the pre-supposition that the canonical prophets were necessarily true and their opponents necessarily false.

There is no etymological basis for this distinction. *Rô'eh* and *hōzeh*, the most common titles of the earliest prophets, are used interchangeably with reference to the same persons. We are not able to distinguish between the various etymological possibilities of *nābî'* on the basis of subsequent prophetic behavior. The etymological approach only serves to strengthen the argument for the early multiplication of prophetic functions, thus making all but inevitable the later confusion characterizing the Hebrew use of the word for prophet.

Neither does a comparison of prophetic methods provide justification for this distinction. Ecstasy, visions, auditions, dreams, symbolical behavior, divination and the use of the formula "Thus saith the Lord" — these phenomena were equally familiar to both groups of prophets.

Nor do the biblical criteria of prophecy — conformity with the national religion, fulfillment of prediction, miracle working, doom as the content of prophecy, holiness of life and the call from God — enable us to distinguish genuine from spurious claimants to the prophetic office.

The first important distinction was discovered in their respective attitudes toward the cultus. Whereas the false prophets endorsed the existing system of ritual to the point of participation, most of the great prophets opposed it to the point of advocating its elimination.

A similar difference may be noted in their respective attitudes toward the nation. Whereas the false prophets contended that Yahweh and Israel must stand or fall together, the great prophets made Yahweh's sovereignty independent of Israel.

Yet the latter failed either to achieve true universalism or outgrow the primitive notion that national fortune and ethical character have a cause-and-effect relation.

Morality is the point at which the contrast becomes clearest. Whereas the false prophets appeared without either high moral challenge or genuine moral character, the great prophets, though imperfect men with an imperfect message, came before their hearers proclaiming a great moral challenge undergirded with lofty character.

While this study has noted important differences between the two groups of prophets, so-called "true" and "false," it has marshaled the evidence for certain facts which seem to call for the substitution of some other terms more descriptive of the actual differences that obtained between them. For one thing, the false prophets constitute an invaluable link in the chain of prophecy as a vocation. Secondly, not only do the great prophets fail to exhibit uniform perfection; they quite often take opposite stands on common problems, when one side clearly has to be wrong. Thirdly, notwithstanding the canonization of the writings of the great prophets on practically every major point of difference between them and the false prophets, the attitude of one or more of them approximates quite closely that of the false prophets. While there are many possible substitutes, provided it is recognized that we are distinguishing, as it were, between the genius and journeyman of a common profession, the precise terms matter little.

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SOCIAL SCIENCES

ANTHROPOLOGY

SOME EVIDENCES OF WARFARE IN CLASSIC MAYA ART

(Publication No. 4233)

Robert Lawrence Rands, Ph.D.
Columbia University, 1952

The Maya Indians, particularly of the Classic Period, have often been described as an exceptionally peaceful people. The recently discovered murals at Bonampak have tended to modify this viewpoint, although the paintings have been thought by some to indicate nothing more than the existence of warfare along only the western margins of the Maya area,

perhaps as the result of contact with non-Mayan peoples. The fact that all other scenes of actual fighting occur exclusively in the same region (stelae and lintels at Morales and Yaxchilan) have been thought to strengthen this interpretation. Moreover, certain types of weapons, such as lances, occur most frequently in this western periphery.

The present study does not take specific issue with this interpretation, but a number of modifying factors are pointed out. The distribution of a large number of motifs suggesting militarism are tabulated, in time and space. For example, considerable attention is devoted to the so-called "captive figures" — seated, kneeling, or prostrate figures who are not actually fighting but who are usually shown with arms bound. In addition, types of costume (armor in some cases), which appear repeatedly on both captives and

warriors, are included in the tables. Such accoutrements also occur in certain scenes that undoubtedly portray fighting. In this and in other ways, it is possible to show that a complex exists, which tends to unite the captive figures with actual scenes of battle.

Whereas the scenes of fighting occur only in the western periphery of the Maya area, the captive figures have a higher percentage distribution in central regions such as the Peten. This evidence runs counter to that of the distribution of scenes of battle. Reasons which might explain the conflicting evidence are examined. It seems possible to show that the reasons lie, in part at least, in the different types of sculptured monuments characteristic of the Peten and the west. To put the matter simply, stelae, which are characteristic of the Peten, do not have space to permit scenes of action such as fighting. However lintels and wall panels, in the west, encourage the portrayal of group compositions, thereby permitting scenes of action to occur.

The study is concerned not only with these matters, but with patterns of warfare in Yucatan, at the time of the Spanish Conquest, which seem to have parallels among the Classic Maya. Comparisons are also made with late militaristic patterns and artistic motifs in central Mexico. In addition, a number of possibilities other than warfare are examined at some length, to see if they might explain the "militaristic" nature of the Classic Maya motifs. All in all, the militaristic explanations seem simpler than the others. To explain away warfare, it appears necessary to construct highly elaborate hypotheses. Another aspect of the study is to re-examine the nature and defensibility of the "ceremonial centers," which have often been claimed to be incapable of withstanding attack. The principal part of the paper is, however, an artistic analysis. Percentage occurrences of the various militaristic motifs are tabulated. All in all, the percentages are so high as to require re-evaluation of the belief that the Maya culture was pronouncedly peaceful in its orientation.

Microfilm copy of complete manuscript of 262 pages, \$3.28. Enlargements 6" x 8", 10¢ per page.

BUSINESS ADMINISTRATION

RECOUPMENT CONCEPT OF BUSINESS INCOME

(Publication No. 4196)

Frederick Ernest Horn, Ph.D.
Columbia University, 1952

This study outlines the limitations imposed on corporate accounting by a fixed money unit. As a solution

to these limitations it develops the recoupment concept by which current revenues are to be matched with current costs. It recommends that the accountant go beyond the framework of original cost by adjusting this cost to a current purchasing power equivalent if management is to have a more useful basis for establishing fiscal policy. In the development of the concept the various inventory and depreciation methods currently employed to solve the problems of rising prices are reviewed and each is appraised from a recoupment standpoint.

In the first chapter the study distinguishes between "monetary" income and "economic" income. It lays the groundwork for a critical analysis of the principal concepts of business income and cost recovery. It also puts the problem of economic adjustment of cost in its proper perspective in order to develop the recoupment concept as a guide to management in establishing its dividend and pricing policies.

Chapter II traces the evolution of the accounting concepts of business income in order to ascertain whether these concepts have of themselves reached a point of stability and perfection that would justify a confidence in the superimposing of a new type of income determination. Chapter III sets forth the influence that a wide variety of income by the accountant. It also includes a review of the income concepts developed by economists and the influence these concepts have had on the accountants' determination of business income.

Chapter IV defines the recoupment concept of business income in terms of matching current costs with current revenues. Current cost encompasses the recovery or recapture of the "equivalent" capital advanced in the productive and/or sales effort measured in terms of current purchasing power. Income is the acquisition of additional assets over and above such "equivalent." The chapter also develops the procedures for measuring such costs and income.

Chapter V describes the various inventory methods generally employed to recoup product charges and compares these methods with the "last-in first-out" method. It also includes a detailed description of the "quantity" and "dollar value" methods of LIFO and their effects on the determination of income. It is concluded that the LIFO methods are compatible with the recoupment concept of matching current costs with current revenues.

Chapter VI deals with the recoupment of long term capital outlay through the various depreciation methods. The effects of allocating acquisition cost, current cost measured in terms of purchasing power and replacement cost to revenues are considered. It is concluded that the application of index numbers to convert the depreciation charge to current cost equivalent is compatible with the recoupment concept.

On all sides it is urged that the accounting effects of the changing value of the dollar be made the subject of intensive research and experimentation. Toward that end the financial statements of Western Electric Company Inc. were used as the basis for a case study. In Chapter VII the effects of a change from a FIFO inventory method to LIFO method and the application of index numbers to its depreciation

charges are summarized. It was demonstrated that a knowledge of current costs with respect to product charges and depreciation is significant to management in determining its financial policies.

Chapter VIII summarizes the advantages and disadvantages of the recoupment concept.

Microfilm copy of complete manuscript of 291 pages, \$3.64. Enlargements 6" x 8", 10¢ per page.

ECONOMICS

SOME ECONOMIC ASPECTS OF CROP PRODUCTION

(Publication No.3990)

Wilbur Dahl Buddemeier, Ph.D.
University of Illinois, 1952

Three objectives of the study were: (1) to examine theoretical concepts or models for studying the problems of crop production. (2) to determine whether physical production relationships theorized by the models can be verified from information now available. (3) to consider some problems of adjusting cropping systems to changing production and economic conditions.

The study was restricted to level, productive soils in central Illinois. A specific soil association in a limited geographical area was used in an attempt to control several of the numerous variables affecting crop production. Production was expressed in pounds of grain and hay per rotation acre.

One portion of the study was devoted to forage-grain production relationships over a period of time. The complementary and competing forage-grain production relationships of the model were evident in experimental data from both the Morrow Plots and the Agronomy Farm. The Agronomy Farm experiments made it possible to study catch crop rotations and stand-over legume rotations separately. The limitations of the data were: (1) a small number of different levels of forage crop production, (2) only one level of soil treatment, and (3) non-replication of the Morrow Plots.

The farm production data appear inadequate for this study. This may be the result of too few records; inadequate and inaccurate records of production, and inadequate measures of variables affecting crop production.

Another major portion of the study was the consideration of the problems of land use adjustments through time as forage-grain production relationships and price ratios change. Trends in production through time were used as the major basis of this phase of the study.

Summary and Conclusions

Complementary and competing forage-grain production relationships were evident in the experimental data. However, the small range of percent of land in legumes in the experiments and the lack of statistical significance when farm production data were used limit the preciseness and applicability of the results.

The marginal rates of substitution of forage for grain shown by the Agronomy Farm rotations (1936-1950) indicate an economic advantage for the corn-soybeans system over the stand-over legume rotations for the costs and prices assumed.

The catch crop rotation with the smallest percent sweet clover had the greatest economic advantage of all rotations considered. The superiority of the catch crop rotations over stand-over legumes is probably the most striking comparison made. The least intensive catch crop rotation was superior to each of the stand-over legume rotations. The usual assumption of higher per acre yields from rotations containing higher percentages of legumes is not verified by the Agronomy Farm experiment data.

Statistically significant results were not obtained from the farm record data. A study designed to accurately measure and collect data for the important variables affecting crop production may well provide significant results if such a study is conducted in cooperation with agronomists.

The study of changes in production was designed to show the trend in absolute production as well as the trend relative to production at average yields. Positive upward trends in grain production were more evident for stand-over than for catch crop legume rotations. Increases in grain production appear to be closely associated with the level of soil treatment as well as with the percent of land in forage crops. Annual variations in production decreased as the percent of land in forage crops increased and were less for stand-over than for catch crop rotations. The catch crops were superior to stand-over legumes in two respects. They produced crops of greater value and maintained grain yields and production with minimum sacrifices of current income.

The application of expected price ratios to production expectations would form a logical basis for making adjustments in cropping systems through time.

Microfilm copy of complete manuscript of 216 pages, \$2.70. Enlargements 6" x 8", 10¢ per page.

THE LOCATION OF INDUSTRY IN THE PACIFIC NORTHWEST

(Publication No. 4168)

Edwin Joseph Cohn, Jr., Ph.D.
Columbia University, 1952

The purpose of this study of the location of industry in the Pacific Northwest (the Columbia Basin) is to examine in terms of locational theory the industrial development of an immature but growing economy in an attempt to ascertain why a particular form of development is taking place, thereby to provide some evaluation of the usefulness of locational theory. A special consideration largely responsible for the selection of the Pacific Northwest as the region to be studied was the desire to examine the efficacy of abundant cheap hydroelectric power in attracting industry and aiding the development and diversification of the industries of an area.

The economy of the Northwest has evolved from a raw materials base, the most important elements of which have been timber, fish, and agricultural products. The primary processing of these raw materials, particularly lumber, has been the central feature of Northwest industry and the point from which what little diversification or integration there is has proceeded. There has been little secondary processing or vertical integration, primarily because the Northwest has a small population established at a late date remote from the population and industrial center of the United States. Isolation and the high transportation costs that result have impeded the development in the Northwest of all industries which do not depend on 1) a local raw material which it is not feasible to ship before processing, or 2) a local market. Those producers of finished goods for the national market which have developed in the Northwest, usually by chance, display a strong tendency to emigrate and resettle in the industrial Middlewest.

A new element introduced relatively recently into the Northwest industrial picture has been the cheap hydroelectric power generated on an unprecedented scale at federal dams on the Columbia River (Bonneville and Grand Coulee). Cheap electricity, however, has not contributed as much to industrial diversification as many people had hoped and predicted. Although it has attracted a certain class of industry, the electro-chemical and electro-metallurgical (notably aluminum smelting), which consume vast quantities of power (essentially as a raw material), it has exercised little attraction for industry in general. The availability of power is not itself a positive locational factor, although the absence of power is a major deterrent to industrial development. In most nonelectro-process industries power constitutes a very minor cost. The electro-process industries, however, provide little employment per unit of energy consumed. In fact it is this uniquely high ratio of power costs to labor and material costs which attracts them to low cost energy regions such as the Northwest. Nor do these primary electro-process industries bring in their wake secondary processors or the fabricators of finished

goods; these later manufacturing operations are market-oriented. Cheap hydroelectric power therefore closely resembles the other natural resources of the region in that it attracts only that phase of manufacturing which must be carried on near the resource; the Northwest is essentially exporting cheap kilowatts frozen into ingots of aluminum much as it exports its pulp or its lumber. This limited result is an inherent restriction on the efficacy of cheap power to promote industrialization.

The experience of the Northwest stresses the limitations of natural resources in furthering industrialization. Whereas raw materials do attract primary processing and, particularly in thinly settled regions, the population to work them, they are unlikely to encourage the diversification and vertical integration necessary to a well-balanced economy unless the raw materials happen to be close to important consumption centers. The same limitation applies to cheap electricity as an industrializing force.

Microfilm copy of complete manuscript of 239 pages, \$2.99. Enlargements 6" x 8", 10¢ per page.

SOME CONSIDERATIONS IN APPRAISING THE LONG-RUN PROSPECTS FOR AGRICULTURE

(Publication No. 3995)

Rex Felton Daly, Ph.D.
University of Illinois, 1952

This investigation prepares a set of projections for the economy in which to cast an appraisal of long-run prospects for agriculture. Specific objectives included: A projection of population, labor force, productivity, total output, the price level, and the relative position of agriculture; i.e., the demand for farm products, farm output, imports and exports, farm income, and prices received and paid for major farm products sold and used by farmers.

Methodology in an appraisal of this type must be primarily historical insofar as past relationships and trends in economic, social, and political conditions provide the basis for appraising the future. For the next few decades, the long-run stability of growth rates and the general inertia of behavior patterns of individuals over time must provide much of the foundation for a framework of projections. However, many empirical measurements and statistical analyses were used in this investigation with what appeared to be varying degrees of success.

In general, it is assumed that the economy will continue to grow during the next two or three decades, at least, much as it has in the past three to

four decades. Although the economy is likely to experience ups and downs, it is assumed that the Government will be at least partly effective in its counter-cyclical measures to maintain full employment and prevent deflations of the magnitude of the depression of the 1930's.

Total demand for farm products during the next quarter century will depend primarily upon the growth of population and per capita income. Because of the relatively low price and income elasticity of demand for all farm products combined, increases in total utilization per person probably will be small even with much higher incomes or somewhat lower prices. The pattern of consumption will continue to change — probably away from grain products and potatoes, and toward more fruits, vegetables, and livestock products in general.

Most calculations in this report were based on a projected utilization by 1970 about one-fourth above the relatively high 1945-49 average. Net exports are expected to be small even though the level of foreign trading is relatively large. The nature of the supply response to an expansion in total demand will largely determine relative prices for farm products and it may also modify the pattern of consumption.

Although total crop acres harvested changed little during the last four decades, land used for food increased about 100 million acres, or approximately 50 percent. About 65 million of the gain reflected a substitution of machine power for horse power. Total cropland probably cannot be increased much during the next several decades. Increased production of food and fiber must come largely from more intensive use of land, which means greater capital inputs and continued innovation. Yields per acre have intended to rise by nearly one percent per year reflecting greater resource inputs per acre and innovations relating to improved seed, insect and disease control, weed control, cropping practices, plant feeding, and other developments contributing to greater output per acre.

Projected population growth and expansion of the economy during the next 25 years probably will not place a heavy strain upon agriculture. But if past growth in farm output is indicative of what can be expected in the future, projected demand for farm products suggests relatively favorable terms of trade for agriculture over the long run. However, if domestic economic activity recedes somewhat and export demand weakens in the next few years, the recent rapid expansion in farm output may contribute to surpluses of some farm products for a period following the defense build up.

Microfilm copy of complete manuscript of 97 pages, \$1.21. Enlargements 6" x 8", 10¢ per page.

AN ECONOMIC STUDY OF THE DAIRY INDUSTRY OF MISSOURI

(Publication No. 3997)

Carlos Clifton Erwin, Ph.D.
University of Illinois, 1952

Introduction

The primary purpose of this study was to determine the economic position of the dairy industry of Missouri. In this connection, an attempt was made to determine the relative importance of dairying in the agricultural economy of Missouri; to determine the relative economic position of the dairy industry in different areas of the state; and to analyze specific problems in the marketing of dairy products and suggest adjustments in line with recent trends in the industry.

The data for this study were obtained from government reports and from various other agencies, including the Missouri State Department of Agriculture, the market administrators of the Federal order markets of St. Louis and Kansas City, and a number of plant managers in Southwest Missouri. An inter-area analysis was made of the composite data thus assembled.

Results of the Study

Dairying has made an important contribution to the economic progress of Missouri agriculture. With relatively favorable climatic conditions and a great amount of land suited best to pasture and forage production, farmers have placed increasingly greater emphasis on livestock enterprises for their cash incomes.

The expansion of dairying has been almost continuous for many years. Milk cow numbers have increased from 800 thousand head in 1920 to approximately a million head in 1950. During a similar period, milk production increased about one fourth. As a result, the sale of dairy products in 1949 accounted for approximately 14 per cent of the total cash farm income. As an additional contribution was provided by the sale of calves and cull cows, it appears that during recent years almost one fifth of the total Missouri cash farm income may be attributed either directly or indirectly to dairying.

As compared to other areas of the state, dairying is of greatest importance in the Southwest area. In both the St. Louis and the Kansas City fluid milk supply areas, the beef enterprise receives more emphasis than the dairy enterprise. The comparatively greater emphasis placed on dairying in the Southwest area appears to be due primarily to the fact that dairying affords an intensive farm enterprise, which utilizes most efficiently the pasture production on the relatively small farms, and provides also the most profitable employment of the farm family labor.

Along with the growth of the Missouri dairy industry, marked changes have occurred in the disposition of the farm production. Sales of farm butter and cream decreased from more than 50 per cent of the total in 1930 to less than 20 per cent in 1950, while

the sales of whole milk increased from about 15 per cent of the total to nearly 60 per cent during the same period.

Significant changes also have taken place in the utilization of milk in Missouri. While the percentage utilized in creamery butter production has declined, the percentage utilized both in the manufacture of the principal dairy products and in the fluid trade has increased greatly.

Conclusion

In the development of the Missouri dairy industry, the introduction of lespedeza for hay and pasture and a vigorous educational program stressing better management and balanced farming were of fundamental importance. The development of a system of modern dairy plants by various interests in the industry to utilize the increased production and convert it into marketable products also has been noteworthy.

Since the population is growing and using increased quantities of dairy products, the Missouri dairy industry should continue to expand. Future developments should emphasize the utilization of both butterfat and solids-not-fat in line with recent trends in the industry.

Microfilm copy of complete manuscript of 223 pages, \$2.79. Enlargements 6" x 8", 10¢ per page.

BELL TELEPHONE LABOR ECONOMICS

(Publication No. 4184)

Curry William Gillmore, Ph.D.
Columbia University, 1952

This is a study of labor's role in the Bell Telephone System. It is not limited to "employee relations" or "union-management relations", but includes these as parts of the larger economic setting. The technical relations of labor to other production factors are outlined, and labor's role in costs, prices and profits is depicted. This gives the economic basis for an analysis of Bell's efforts to control its labor supply for business ends — its employee relations policies; and labor unions' growth and efforts to control the labor supply for their ends.

The score of companies comprising the closely integrated Bell System own four out of every five telephones in the United States and account for a like proportion of the telephone industry's employees, salaries and telephone revenues. The System's main production factors are labor and long-lived capital equipment, and it has rising costs per phone as the size of exchanges exceeds ten thousand phones; labor costs

are over half of operating revenues. Although the System's telephone rates are publicly regulated, management has incentives to produce at low cost.

Bell's labor employed per unit of output has fallen almost as fast in the last thirty years as in the manufacturing industries, but the increase in efficiency of combined production factors has been very slow, and significant increases in wage rates or capital prices must raise telephone rates or lower the rate of return on invested capital.

Bell's service and public utility character largely account for its employee relations policies, including the "community wage policy", which we clarify and test. The stated wage policy generally meets our tests, but instances in which it does not — e.g., isolated cases of labor monopoly — lead us to amend the wage policy to say that Bell, like most other businesses, pays what it must to get the labor it wants.

Telephone labor unions failed to grow before the 1930's, and they developed largely as a result of the labor legislation of that period. A national labor organization soon began, and the abortive Systemwide strike in 1947 was largely the result of disagreement over the issue of Systemwide bargaining; since that strike union-management relations have chilled greatly.

A comparison of conditions in 1935 and 1951 reveals that telephone unions have not significantly affected Bell wages and working conditions, although government intervention has been responsible for some union gains. An analysis of the bargaining power of telephone unions reveals that their future impact will also be relatively small.

Bell union-management relations are hostile, not because (as the 1950 Senate Committee on Labor and Public Welfare would have us believe) A. T. and T. controls its subsidiary companies' labor policies, but because union leaders and managements see their organizations as being competitive, rather than complementary. Systemwide bargaining (a heated issue in this industry) is not likely to emerge in the foreseeable future, but unless there is increasing government interference more harmonious union-management relations should emerge — as unions and managements continue their progress in understanding the basic facts of their case.

Microfilm copy of complete manuscript of 294 pages, \$3.68. Enlargements 6" x 8", 10¢ per page.

FUND-FLOW ANALYSIS IN ECONOMIC RESEARCH

(Publication No. 4187)

Howard H. Greenbaum, Ph.D.
Columbia University, 1952

This study is a survey of certain methods employed by economists in utilizing data contained in

published financial reports. These methods are related variations of a systematic apparatus for deriving statistics of business expenditures and the means by which they are financed: that is, for analyzing the sources and uses of funds.

The presentation has been designed to serve the needs of the economist who is not a trained accountant but who is responsible for interpretations of the accountant's product. However, those with a more complete accounting background should also find points of interest.

Part I (two chapters) provides a background for the more detailed material of later sections by describing how and why economists in many fields have used fund-flow analysis. Stress is placed on the fact that fund-flow analysis involves not one but a variety of methods, and that the method utilized by the economists is directly dependent upon the purpose of this study.

Part II (eight chapters) deals with various aspects of the most popular type of fund-flow analysis, the cash-or-equivalent fund method, as employed by Dirks, Dobrovolsky, Hersey, Koch, Merwin, Schmidt, Terborgh and many other economists. The discussion is concerned first with general problems, including sources of data, adjustments required, and forms of presentation. Attention is then given to problems associated with more specialized topics, such as fixed assets, inventories, depreciation, retained earnings, and internal and external sources of funds. Finally, there is an attempt to assess the usefulness and limitations of the cash-or-equivalent fund method.

Part III (two chapters) explains the construction, utility and limitations of several fund-flow statements derived by techniques other than the cash-or-equivalent fund method, and discusses the fund-flow methods employed in macro-economic studies of the national economy, giving consideration to the work of the United States Department of Commerce, Copeland, Derksen, Goldsmith, Stone, and other economists. The techniques reviewed include the cash fund-flow method, the net working capital fund-flow method, the net negotiated debt fund-flow method, the loan fund-flow method, the general claims fund-flow method, and the trading fund-flow method.

Emphasis is given to the point that a special fund concept applied to a gross flow study of each major sector of the economy could supply an integrated and comprehensive report of transactions involving real goods and their financing; and that such a report would include the statistics relative to national income as well as several classes of transactions not covered by that measurement.

Microfilm copy of complete manuscript of 400 pages, \$5.00. Enlargements 6" x 8", 10¢ per page.

A STUDY OF PERSONNEL RELATIONS IN NEGRO BUSINESSES

(Publication No. 4068)

Vivian Wilson Henderson, Ph.D.
State University of Iowa, 1952

In the past two decades increasing emphasis has been placed by various institutions, agencies and groups in our economy (the government, labor organizations, business associations and advisory groups), on the personnel aspects of business operations. Many advancements have been made in the field and, as in many phases of business operations, the larger concerns have set the patterns which have been followed by the smaller concerns. To some degree the smaller concerns have recognized the problems of personnel relations and in many cases have taken steps to deal with them to the extent of their capacities. However, there is one segment of the economy and the small business world which has remained too far behind in the area of personnel relations. That segment is occupied by businesses owned and operated by Negroes.

The Committee For Economic Development in its Publication Meeting the Special Problems of Small Business points out how the advantages small concerns have relative to closeness of employer and employee are offset in part by the disadvantages confronting these firms relative to attracting and holding good personnel. Such disadvantages embody the inability to provide pensions, low-cost life and accident insurance and other benefits providing a measure of economic security. Most small enterprises have not been able to develop such programs because of the heavy fixed costs involved and because the high cost of servicing small plants discourages underwriting by insurance companies.

It is assumed that Negro businesses, which are in the main small businesses, desire to be fully integrated into the business activities of the American economy. Such can be hastened with the attainment of maximum operational efficiency. The status of personnel relations offers a measuring rod of the degree of operational efficiency. It has been shown that there is a close correlation between the generally inefficient level of Negro business operation and personnel relations programs in these organizations.

The findings show that Negro business has lagged behind in the field of personnel relations chiefly because of the following factors:

1. The failure of Negro business managers to install personnel recruiting programs.
2. A historical practice of relying upon race pride, achievements and struggles to attract and hold employees.
3. The fact that Negro business managers do not publicly make positions and opportunities known to prospects, accounting to a large degree for the failure of Negro businesses to secure trained persons.
4. A general failure of Negro business managers to make use of or approach scientific personnel management techniques to promote employer-employee relations.

5. Finally a situation prevails whereby salaries and promotions are not based upon standardized policies and procedures but to a large extent upon such factors as "favoritism" and "pull."

These factors point toward a situation characterized by unsound personnel relations in Negro businesses. Recommendations have been made designed to aid in promoting sound personnel relations. The recommendations are of two types. One is directed toward making improvements from within the organization and utilizing scientific personnel techniques within the existing framework. The other set of recommendations embodies a plan for associated efforts on the part of several small businesses for the purpose of arranging employee security programs for groups of businesses, in which case advantages comparable to those enjoyed by larger concerns might be achieved.

All recommendations refer to small businesses in general and are specifically directed toward Negro concerns. The findings show a general lack of operational efficiency in Negro businesses which in part has been traced to unsound personnel relations programs. The recommendations are designed to aid in improving upon the status of personnel relations and personnel management in these businesses, thereby aiding in achieving full integration of Negro business activities into the American Economy.

Microfilm copy of complete manuscript of 314 pages, \$3.93. Enlargements 6" x 8", 10¢ per page.

COLLECTIVE BARGAINING IN THE RAILROAD INDUSTRY: 1934-1950

(Publication No. 4203)

Jacob Joseph Kaufman, Ph.D.
Columbia University, 1952

During the past decade the problem of strikes, threatened strikes, the issuance of court injunctions, and government seizures, has arisen in the railroad industry. This problem is particularly acute in view of the important role that transportation plays in our economy, in peace and in war. Since the Railway Labor Act, as amended, provides for certain orderly procedures for the settlement of all labor disputes in the railroad industry, an explanation of the unstable labor relations in the industry is in order.

Part I is devoted to a discussion of certain background material which is essential for an understanding of the labor problem in the railroad industry. First, it is suggested that the concentration of traffic in the hands of a relatively small number of railroads and the converging of most traffic at a small number of terminals give the railroad labor organizations certain strategic opportunities to strike and

tie-up the transportation system. In addition, the financial position of the railroads and the recent technological advances made in the industry have created conditions which force the railroads to reduce employment. Second, the decline in employment over the years is described. Third, the method of wage payment and the working rules in the railroad industry are discussed and the suggestion is offered that they have arisen as a result of the demands of the workers for greater security and have been a major irritant in collective bargaining in the railroad industry. Fourth, the labor organizations in the industry are discussed and their militancy and internal conflicts analyzed. Finally, a survey of the history of governmental intervention in railway labor disputes is presented, revealing that the present legislation is an outgrowth of experience under previous legislation and that strikes in the railroad industry reflect, in part, the economic and social conditions of the period under consideration.

Part II is concerned with the causes of the breakdown of the Railway Labor Act, as amended. An analysis of the record of achievement is made in order to suggest that the statistical record fails to disclose the labor strife in the industry. Labor difficulties in the railroad industry can be ascribed, first, to the deterioration in the wage position of the railroad workers as compared with other groups of workers. Such deterioration is explained, in part, by the failure of the emergency boards to employ consistent, objective standards in determining wage rates, and, in part, by the existence of virtual compulsory arbitration in the railroad industry, as a result of White House and court intervention. Such compulsion has deprived railroad labor of its sole bargaining weapon — the right to strike. A second reason for the virtual collapse in collective bargaining is the breakdown of the grievance procedures set forth in the Railway Labor Act, as amended. This stems from a basic conflict between the parties — the unions seeking to maintain and extend the working rules, the railroads seeking to eliminate or modify them. A third reason is the very existence of the procedures of the law itself.

Part III is devoted to a discussion of methods of dealing with essential industries. It is pointed out that there are essentially three approaches to the problem: one is to curtail the right to strike in such industries, another is essentially to permit strikes in such industries, and still another is simply to keep "hands off" — legislatively speaking — and to act whenever necessary. At the same time, the mediation and conciliation activities of the Government should be expanded. Each proposal is discussed and analyzed.

Part IV summarizes the study and offers certain recommendations for meeting the problem of strikes in the railroad industry, recognizing at the same time that the problem cannot be solved completely in view of certain basic conflicts within our society.

Microfilm copy of complete manuscript of 310 pages, \$3.88. Enlargements 6" x 8", 10¢ per page.

THE MARKETING AND PRICING OF MINNESOTA CREAMERY BUTTER

(Publication No. 4130)

Stanley Frederick Krause, Ph.D.
University of Minnesota, 1952

The purpose of the study was to evaluate the marketing system for Minnesota creamery butter in relation to criticisms which have been leveled against it. Some persons think marketing margins in butter are excessive. Central market butter quotations also have been criticized. In terms of efficiency, (1) less costly marketing procedures, and (2) more accurate and quicker reflection of consumers' desires and changes in market conditions were sought.

Hypotheses that price variations between plants were associated with butter volume, distance from markets, ownership, and diversification were tested. Other hypotheses were that price variations between plants were associated with location of responsibility for sales decisions, size of shipments, and specific management practices. The results were used in studying the rationality of price relationships and exploring the market's strengths and weaknesses.

The primary data were collected from 109 Minnesota creameries during 1950. Price data on all sales by the sample creameries during June, 1949 and February, 1950 were among these data.

Some aspects of manufacturing operations of Minnesota creameries were discussed. Marketing procedures and institutions in the creamery-first receiver market also were discussed.

Payment for butter shipments to buyers other than cooperative federations typically are based on a New York or Chicago market quotation. Private and governmental agencies quote the market. The private quotations are the commonest pricing basis. Provision for quotation based settlement typically is made under the terms of informal verbal agreements; these also specify other sales terms. Agreements and Exchange trading were appraised in detail. Desire to avoid frequent price bargaining motivates the use of quotations as pricing bases. The small volume of Exchange transactions and direct marketing are related to the vertical integration throughout the market.

The relationships between price variations, volume, and a specially devised "Sales Management Index" were studied simultaneously. Large plants tended to receive higher prices than small plants for shipped butter. No relationship between price and ownership and no direct association with diversification were found. Higher prices were received by plants having active sales programs, as indicated by the "Index of Sales Management."

No relationship between price and the person or group responsible in the plant for sales decisions was found. Creameries which used drafts received slightly lower prices than other plants. Higher prices were received from chain stores than other buyers during the period studied. Plants which made large individual shipments received no higher prices.

A large part of the price variations between

creameries was not associated with the independent variables incorporated in the hypotheses tested. Much of this market imperfection results from the tie between the creamery-receiver and the wholesale markets. The central markets imperfectly register the equilibrium price, largely because of the predominance of direct, committed sales.

Predominance of direct selling results in imperfect mobility of butter and contributes to erratic price quotations. Market information is imperfect. Recommendations were designed to improve these conditions.

Improvement of grade standards would be useful; specific suggestions were not considered. Prices set by a weekly pricing committee potentially would provide a superior pricing basis for creameries' shipments. Weekly reports of net prices received by creameries would improve market information at creameries.

Educational programs to develop the understanding of creamery personnel regarding the market itself and as related to marketing problems should be undertaken by extension personnel and trade groups. Use of written sales agreements was recommended.

Implementation of these recommendations would not reduce wholesaling margins in butter. More rapid and accurate reflection of consumer desires and changes in market conditions on prices creameries receive would result. The market would then guide production more efficiently.

Microfilm copy of complete manuscript of 287 pages, \$3.59. Enlargements 6" x 8", 10¢ per page.

WARTIME CURTAILMENTS AND POSTWAR BEHAVIOR OF DURABLE GOODS: WORLD WAR I AND II.

(Publication No. 4223)

John Neter, Ph.D.
Columbia University, 1952

Curtailments in the production of durable goods in the United States during World War I and II were studied as to their influence upon the immediate postwar behavior of these goods and upon that of the economy generally.

Both world wars necessitated curtailments in the production of civilian-type durable goods, although these curtailments appear to have been confined only to consumer durable goods during World War I. The curtailments during World War II in almost all instances were many times as severe as those during World War I. Among the consumer durable goods, new residential construction and output of passenger autos were two of the most curtailed items during both wars. Among the producer durable goods of peacetime usefulness, new nonmanufacturing productive facilities were much more curtailed during World War II than new manufacturing productive facilities. The curtailments, though, were selective in both areas. The conversion of industrial facilities during World War I was

slight compared with that during World War II.

The expansion in the production of consumer durable goods during postwar II, the first four years after World War II, lasted substantially longer and made greater gains, relative to prewar, than during postwar I, the first four years after World War I. A similar picture was found in the case of producer durable goods. The postwar II contraction in the production of durable goods generally was of shorter duration and of substantially smaller magnitude than that of postwar I.

Curtailments during World War I in residential construction and automobile production probably helped in bringing about an early postwar expansion in the production of these items, but did not seem to have had any further effects during the postwar I period. It is to be doubted, on the basis of incomplete information, that the postwar I behavior of other durable goods was greatly affected by wartime curtailments in their production.

The World War II curtailments in the production of durable goods, on the other hand, profoundly influenced the postwar behavior of these goods. This influence existed, however, amidst a myriad of other forces, each influencing one another, so that no simple, direct relationship was evident between the extent of curtailments and the postwar behavior of durable goods.

The extensive World War II curtailments helped in bringing about generally optimistic business anticipations at the end of the war. The speed with which postwar production caught up to prewar levels did not depend so much on the extent of war curtailments, though, as on the ease of conversion and the availability of materials. The postwar II expansion process generally came to an end earliest for those durable goods whose postwar output increased rapidly over prewar levels and which suffered the smallest war curtailments.

Those durable goods which were extensively curtailed during World War II and whose postwar expansion was not too marked relative to prewar levels either did not decline during the general postwar contraction phase or, more usually, underwent relatively short and mild declines. The longest periods of declining activity were experienced by those durable goods which reached their postwar peaks earliest.

The amplitudes of the postwar II cyclical fluctuations were generally much milder than those of the "average" reference cycle in the United States. The contrast was not as great between the first postwar I business cycle and the "average" cycle.

While broad generalizations cannot be made on the basis of one or two cases, the postwar II experience did furnish suggestive insights regarding the bunching of demand, the possibility of consumer expenditures playing an active role — particularly expenditures for durables — and the importance of structural changes in the economy. These clues have implications for economic behavior in general.

Microfilm copy of complete manuscript of 409 pages, \$5.11. Enlargements 6" x 8", 10¢ per page.

INTEGRATING NATIONAL AGRICULTURAL AND FISCAL-MONETARY POLICIES

(Publication No. 4006)

Thaddeus Joseph Obal, Ph.D.
University of Illinois, 1952

The study is primarily an attempt to develop an overall or integrated approach to public policy research. The author considers the "piecemeal" approach of most policy research ineffective and insufficient by itself.

Policy integration refers to the process of combining, testing and adjusting different sector policies and general policies so that the result is an integrated overall policy. Primary emphasis has been laid on deductive analysis as the necessary first phase of the integrated approach. It precedes any empirical testing of hypotheses and policy models.

The study illustrates the deductive phase of the suggested research approach by integrating national agricultural policies with fiscal-monetary policies. The methodological procedure employed is outlined in Chapter II as follows:

- (1) Selection of a set of general criteria.
- (2) Explicitly stating the economic and political assumptions.
- (3) Listing of various policy goals and methods to be considered.
- (4) Combining and testing the following for conflict and compatibility in terms of the general criteria: goals, methods, goals and methods together in individual policies, sets of complete agricultural policies, sets of fiscal-monetary policies, and integrations of agricultural and fiscal-monetary policies.
- (5) Determine and recommend which final integration would likely be the most practical and useful in a realistic economic and political framework.

Overall criteria are unavoidably the cornerstones of any logical public policy research. The following social and economic criteria were selected:

- (1) productive and allocative efficiency of the economy;
- (2) efficient distribution of real income;
- (3) economic and social progress (development);
- (4) physical and mental peace;
- (5) individual human freedoms, including the dignity of man.

Agricultural policy "goals" were reviewed and tested (individually and together) in Chapter III. They included improved utilization of resources in commercial agriculture, minimum levels of agricultural prices and income, parity prices, flexible farm prices, and parity income.

Similarly, the following agricultural policy "methods" were treated in Chapter IV: forward prices, flexible price supports, a purchases-storage-sales program, direct income subsidies, production controls, and marketing quotas.

Selected fiscal-monetary goals and methods were reviewed and tested in Chapters V and VI respectively. The examples included price level stabilization, employment stabilization, high levels of aggregate consumer spending and of aggregate investment

expenditures and balancing the federal budget (annually and cyclinically).

Fiscal-monetary methods tested included the automatic gold standard, flexible bank reserve requirements, flexible rediscount rates, open market operations, flexible tax rates and exemptions, consumer income subsidies, commodity reserve currency, and underwriting aggregate consumer spending at a full employment level.

Various policy goals and methods were weaved together in Chapter VII to bring forth two tentative agricultural policies and two tentative fiscal-monetary policies. Each agricultural policy was combined with each of the fiscal-monetary policies. The result was four overall integrations that warranted further consideration in public policy-making. It was pointed out, however, that all four overall policies contained some objectionable features.

The final recommended integration was considered "least objectionable" in light of political and institutional factors. It included a fiscal-monetary policy emphasizing employment and price level stabilization goals with associated policy methods and an agricultural policy stressing goals of resource efficiency in commercial agriculture, farm price flexibility, and parity income but cautiously limiting extensive use of agricultural policy methods such as forward prices, purchases-storage-sales program, and direct production subsidies.

Appendix A (Suggested Empirical Tools of Analysis and Testing) discusses the money flow technique, social accounting, input-output analysis, the multiplier and the accelerator.

Appendix B (Function of Price and Wage Controls in a Defense Economy) is a digression on the function and limitations of direct controls during a defense economy and under conditions of increases in prices and costs.

Microfilm copy of complete manuscript of 345 pages, \$4.31. Enlargements 6" x 8", 10¢ per page.

STATE EFFORTS TO SETTLE PUBLIC UTILITY LABOR DISPUTES

(Publication No. 4096)

Charles Duane Phillips, Ph.D.
State University of Iowa, 1952

The purpose of this study is to examine state legislation pertaining to the settlement of public utility disputes. The problem which needs solution stems from the conflict between the principles of collective bargaining which use the strike and lockout to bring about agreement and the need of the consuming public for continuous service of certain utility services. The public health, safety, and welfare cannot tolerate

a lengthy deprivation of essential utility services. Almost everyone agrees that the social interests take precedence over those of the individual or group. If public welfare is the more important principle then what is to be substituted for the right to strike and lockout so as to produce the fewest adverse effects upon collective bargaining and the goals it seeks to obtain?

Twenty-seven states have enacted labor laws which have as their purpose the settlement of public utility labor disputes by compulsory settlement methods. Nineteen states specifically apply their laws to public utility labor disputes, the remainder apply to all intrastate labor disputes. These states apply three methods of compulsory settlement as supplements or substitutes for collective bargaining. They are compulsory fact-finding, seizure, and compulsory arbitration. The state statutes cover some twenty-seven industries. There has been a dearth of experience under the state statutes primarily because most of the statutes have been enacted since 1946. The available experience does not indicate whether the states with utility labor dispute legislation have incurred fewer disputes and interruptions in service than the states without such legislation. Instead, the available evidence has been used to point out the strengths and weaknesses of compulsory settlement techniques as used by the states.

The effects of state public utility legislation can only be appraised by examining the manner in which it is interpreted by the courts and administered by the executive branch of the government. Of the three compulsory methods only seizure and compulsory arbitration require construction by the courts. There is no binding award in the case of fact-finding.

The seven major problems involved in the use of compulsory settlement are as follows: (1) the problem of defining an emergency; (2) the effect of compulsory settlement upon collective bargaining; (3) the lack of acceptable wage criteria; (4) the relationship between the public utility regulatory body and the arbitration tribunal; (5) the penalties to be imposed against violators; (6) judicial review and administration; (7) political factors.

The compulsory settlement statutes contain a number of weaknesses which are analyzed and an attempt is made to show how certain provisions of the statutes can be improved through the use of an "ideal" statute. In conclusion it may be said that the judicious use of compulsory settlement techniques can make them a useful supplement to the collective bargaining process in the public utility field.

Microfilm copy of complete manuscript of 286 pages, \$3.58. Enlargements 6" x 8", 10¢ per page.

INDIVIDUAL DIFFERENCES IN
ENTREPRENEURIAL AND MANAGERIAL
ABILITY AMONG ILLINOIS
FARM OPERATORS

(Publication No. 4010)

Franklin Jacob Reiss, Ph.D.
University of Illinois, 1952

This thesis approaches the problem on two levels, (1) a conceptual outline of the entrepreneurial-managerial function and (2) an empirical investigation of management differences among individual operators of Illinois farms.

On the conceptual level the entrepreneurial-managerial function (designated the entrepreneurial function) was viewed as being primarily a decision-making function oriented toward the specific goals and purposes held by the individual. Decision-making, as a mental process, uses knowledge, information and experience (entrepreneurial capital) as the basic material from which projective imagination creates expectations that in turn become plans and programs which are the objects of decision. Implementing decisions through appropriate action involves the concomitant exposure to risk, uncertainty, liability and reward. The latter, of course, may be positive or negative. The particular return to entrepreneurial-managerial efforts (the entrepreneurial wage) is that anticipated return (both economic and non-economic) necessary to secure the performance of the function in the long run.

Motivation was viewed as a crucial factor in the performance of the entrepreneurial function, both as to the direction of motivation (the kind of goals and purposes) and the degree of motivation toward any specific objective. Differences in the social environments of individuals contribute greatly toward variations in their motivational patterns. Learned or acquired needs may be non-economic in character but employ economic means toward their satisfaction.

On the empirical level the inquiry was guided by the following hypotheses: (1) that certain personal characteristics of individual farmers may be discovered to be consistent in the individual, observable to others, and related to farm success in such a degree that measures of observed differences in these characteristics may serve as valid indices of differences in individual achievement; and (2) that the forced-choice is a rating device that is applicable to entrepreneurial activity, relatively free from rater bias, and apt to yield valid measures of differences in entrepreneurial competence.

A list of 257 descriptive items gleaned from 723 written essay descriptions of "good" and "poor" farmers provided the basic elements for construction of a forced-choice rating form and for inferences on personality traits probably associated with farm success. Among the items deemed most significantly related to farm success were those dealing with the direction and degree of motivation, those dealing with knowledge, experience and willingness to learn, and those dealing with vision, foresight, planfulness,

and timeliness.

Significantly related to a comparative ranking of subjects in the minds of the raters, were such items as the size of the farm, the amount of livestock kept, the progress toward land ownership, the quality of soil in the farm, and the level of opportunity toward the achievement of success. Not significantly related were the age of the operator and the years he completed in school.

Significant correlations were obtained between objective measures of financial success (both aggregate and ratio measures) and conventional as well as forced-choice ratings on 236 account-keeping farmers in western Illinois. The study demonstrated the validity of results with conventional and the forced-choice rating forms.

Microfilm copy of complete manuscript of 270 pages, \$3.38. Enlargements 6" x 8", 10¢ per page.

FOREIGN CAPITAL IN
ECONOMIC DEVELOPMENT:
THE JAPANESE EXPERIENCE, 1868-1913

(Publication No. 4235)

Edwin Pierce Reubens, Ph.D.
Columbia University, 1952

This study is concerned with the role of foreign capital as a strategic factor in economic development. It deals with the experience of Japan during the era of her evolution from a traditional agrarian society to a diversified economy in full course of industrialization. This era presents the closest available parallels to the problems faced by the relatively retarded countries today in the Far East, Middle East and parts of Latin America.

The general method of this study is to reveal and measure certain changing functional relations within a historical developmental process. The analysis centers on two principal relationships: the "degree of dependence on foreign capital" and the "capacity to absorb foreign capital inflow".

The entire Japanese developmental span from 1868 to 1930 is first divided into four periods on the basis of marked shifts in foreign capital inflow and in general economic activity. The first two periods, from the Meiji Restoration of 1868 to the close of the Sino-Japanese War in 1895, and from 1896 to the outbreak of World War I in 1914, are analyzed in detail. The following two periods, the era of World War I and the decade of the 1920's, are surveyed more broadly, with a view to testing the long-term character of the trends and patterns revealed in the earlier stages.

In each period, the quantitative importance of the net foreign capital inflow is shown in relation to the rate of economic development. The detailed analysis of the underlying forces turns first to the factors which tended to minimize total capital requirements, to maximize domestic saving and productive investment, and indirectly to lighten the burden on the balance of international payments. Attention is then given to the

emergent problems of bottlenecks, inflationary pressures, and foreign-exchange stringency. Finally, the quantitative and qualitative contribution of foreign capital inflow is shown to have been the means of holding the economic pressures within limits of tolerance.

The following propositions summarize the Japanese experience with foreign capital:

1. In quantitative terms, foreign capital did not bulk very large over the whole span of Japan's development. The degree of dependence upon external assistance ranged from virtually nil during the first period to substantial proportions during the second period; shifted to a net outflow of capital during the third period; and reverted to a modest inflow during the fourth period.

2. The modernization of Japan after 1868 was initiated and carried through by the Japanese themselves. Foreign capital and other external influences served essentially as catalytic agents.

3. The moderate scale of Japan's net dependence on foreign capital was made possible by the strenuous contribution of Japan's domestic economy. But the native potentialities were limited by the poverty and immobility of an Oriental economy, as well as by the necessities of interdependence and sequence in the development process.

4. The shift from virtual independence of foreign capital before 1896 to substantial dependence thereafter resulted chiefly from an acceleration in the rate of investment. The inflow of external assistance served not only to break specific bottlenecks and relieve macro-pressures, but also to improve the functioning of the domestic capital market.

5. Japan's foreign capital came predominantly in the form of government borrowing from private investors, a form better adapted than private direct investments to the aggregate character, changing pattern, and long duration of her needs for external assistance.

Japan's evolution provides an extreme example of how much can be achieved in a poor country with a suitable and sustained but relatively modest inflow of foreign aid.

Microfilm copy of complete manuscript of 253 pages, \$3.16. Enlargements 6" x 8", 10¢ per page.

LAND DEVELOPMENT-VALUE PROBLEMS AND THE TOWN AND COUNTRY PLANNING ACT OF 1947

(Publication No. 4238)

George Gabriel Sause, Jr., Ph.D.
Columbia University, 1952

The dissertation consists of an analysis of the British Town and Country Planning Act of 1947 and of the problems which were to be solved by this Act. The underlying problem concerns the manner of controlling the use of land so that it makes the maximum contribution to welfare. Since 1909, land use in

Great Britain has been subjected to increasing government control. This has caused land values to differ from the levels they would have attained if the government had not been involved.

Prior to 1947, an attempt was made to collect the betterment accruing to the landowners who benefited from government action and to pay compensation to those whose land had depreciated in value.

In practice, compensation was paid but betterment could not be collected. This financial burden on local governments prevented the local planning authorities from exercising adequate control of the land within their jurisdiction.

The Act of 1947 has made town and country planning compulsory for the local government units and has given the National Government power to direct the type of planning that takes place. It has, by a system of grants-in-aid, increased the municipalities' ability to purchase and develop areas that require comprehensive redevelopment. The main emphasis of the dissertation, however, is on the attempt to solve the compensation and betterment problem which is caused by the shift in land values.

By the Act's provision, no land may be developed without permission of the local planning authorities. Thus, the government has acquired the right to develop land and, hence, its development value. Compensation for the loss of the development value is to be paid. However, a limit of £300,000,000 has been placed on the compensation fund. This is done so that the total compensation paid does not exceed the total development value contained in the land of Great Britain. If this were not done, the development value of each individual piece of land would be paid by the government, although experience shows that not all potential development takes place.

Allowance for this unrealized development is made made by limiting the compensation payments to £300,000,000. The total of the individual claims for compensation is expected to exceed this global sum so each claimant will receive less than the full value of his claim. The effect of the global sum, therefore, is to discount the fact that not all the expected development will take place.

Private landowners are not to gain if the government permits them to develop their land. When permission to develop is granted, a development charge is levied. This is a payment to the government which is to equal the increase in the value of the land which results from the grant of permission. Thus, the development rights which the government now owns are sold back to the landowners wherever development is permitted.

Since the ownership of land no longer includes the right to develop, all land is to be reduced to its existing use value. Therefore, the old problem of shifting the development value of land is eliminated since all development rights, and so development values, are owned by one institution — the government.

Since the Act's passage, the capital and labor shortage has prevented the municipalities from making full use of their power to acquire and develop land. It has also prevented a test of the extent to which the development charge discourages private development.

The conclusion drawn is that the compensation and development charge system has many faults but none of the suggested substitutes is an improvement.

Microfilm copy of complete manuscript of 258 pages, \$3.23. Enlargements 6" x 8", 10¢ per page.

CHANGES IN APPLICATIONS OF AUDITING TECHNIQUES FOR VERIFYING CURRENT ASSETS AND CURRENT LIABILITIES

(Publication No. 4014)

Kwang Chi Sih, Ph.D.
University of Illinois, 1952

The present research consists of an investigation into the historical perspective of the field of auditing with a view to one clear-cut objective: that such an investigation may possibly assist in the solution of future problems. In order to trace the course of development of the field under investigation, the writer endeavors to set no definite time period to be covered by the study, though the major emphasis has, in every conceivable way, been placed upon those developments which took place within recent years. The study is, however, restricted mainly to the consideration of current assets and current liabilities since they represent an area in which significant as well as most changes in auditing have occurred of late.

The method of approach comprises three stages: (1) a brief survey of cash audits prior to the emergence of the accounting profession together with a comparison of the essential characteristics of these early audits and those of today, (2) an exhaustive inquiry into the writings of various pioneers in the formative period of the accounting profession alongside a commentary interpretation of the nature of the problems within this period with respect to the verification of current assets and current liabilities, and (3) a detailed account of the auditing problems within recent times and a projection based on textual evidence gathered from numerous publications, of the possible future course of development of the verification of current assets and current liabilities.

The method of presentation and analysis adopted in this research differs from the traditional one in that the latter has been employed, almost without exception, by way of a classification of such items as cash, receivables, inventories, securities, payables, etc., each of which then receives a descriptive treatment patterned upon a seemingly fixed rules of thumb. The present study emphasizes, on the other hand, the auditing techniques as applied to the separate items rather than the items as such. These techniques are: (1) physical inspection, (2) written confirmation, (3) vouching, (4) clerical verification, (5) account analysis, (6) comparison, (7) oral inquiry, and (8) scanning. Each has its usefulness and limitations, and may vary widely according as the way or the scope of its application differs from one engagement to another as it is called for by profes-

sional judgment to meet particular circumstances.

Care has been taken to note that an historical survey as such would be of little value, especially if it is to be projected into the future unless the factors underlying the trend are discovered so that these same may be assessed different degrees of importance as to their influence upon the future. For this reason, the dissertation has been shaped not as a mere description of a sequence of events but as an attempt to present logical explanation of the interrelationships of such events. Emphasis is placed on the search for the reasons why changes had to take place as they did. The influences which brought about the modifications of the applications of auditing techniques are examined. Furthermore, in order to find some clues as to why those changes did not occur either earlier or later, consideration is being given to the background of such changes. By viewing social, economic and political conditions in retrospect, some possible suggestions are derived to aid further development of the auditing field and the progress of the profession as a whole.

Microfilm copy of complete manuscript of 337 pages, \$4.21. Enlargements 6" x 8", 10¢ per page.

PROGRESS IN RURAL ZONING IN NORTHEASTERN MINNESOTA

(Publication No. 4134)

Carl Henry Stoltenberg, Ph.D.
University of Minnesota, 1952

This study is concerned with the evaluation of rural zoning in northeastern Minnesota since 1939, the year the Minnesota Legislature passed the county rural zoning enabling act. The purpose of the study was to determine the extent of zoning accomplished, the effects of zoning on regional development during the period 1939-1951, and the probable future usefulness of zoning in land programs in northeastern Minnesota. It was also hoped that the study would indicate means of adjusting existing zoning programs so that they could be more efficient and effective.

One chapter is devoted to an analysis of the evolution of the social and economic problems of the region under consideration. The conclusion of this analysis is that the most important underlying causes of difficulty have been the following: (1) a general overestimate of the long run trend in demand for land for agricultural production; (2) a failure to recognize any productive uses of land other than agricultural; (3) an isolated settlement pattern; (4) an inappropriate organization of local government; (5) poor taxation policies; and (6) an incomplete transition from a pioneer to a contemporary society.

The second chapter describes the regional land use programs of the late 1930's and the consequent development of rural zoning as a means of effecting desirable changes in these basic maladjustments.

Recent developments in closely related programs are summarized in a third chapter, with the objective

of indicating the interdependence of these programs and zoning. Only the more important developments and those which are closely related to zoning are discussed. The programs considered are those of isolated settler relocation, adjustment in the structure and functions of local governments, adjustment in state grant-in-aid policies, disposition and management of tax-forfeited lands, and public land purchase and exchange.

A fourth chapter appraises the adequacy of existing county zoning ordinances as to the total area restricted, the pattern of zoning developed, and the effectiveness of zoning administration, and analyzes the results of zoning during its short history in this region. The following conclusions may be drawn from this appraisal and analysis:

1. Eight of the fourteen counties have zoning ordinances which restrict further settlement from an average of sixty percent of the county's area.
2. The amount of land restricted within zoned counties is generally less than would seem wise in the light of recent settlement trends.
3. The "township" nature of zoning has led to the development of restricted districts which are small and scattered. This makes effective administration difficult.
4. Zoning ordinance administration has generally been inadequate, despite the need for only minor administrative attention during recent years of decreasing rural populations.
5. The number of new cases of isolated settlement has been reduced by zoning.
6. Zoning programs have apparently stimulated the productive use of the region's resources in forestry, recreation, and other enterprises in addition to agriculture.
7. Zoning has aided school district reorganization but evidently has not been of widespread value to other programming efforts.
8. Zoning ordinances appear capable of greatly contributing to the future social and economic welfare of the region if the individual ordinances are kept effective and their administration is improved. The need is seen for a regional program encouraging the reexamination of existing ordinances and administration and the reconsideration of zoning by unzoned counties.

A final chapter is included in which are proposed research and zoning activities that seem advisable in the light of the findings of this study.

The text of the Minnesota enabling act and a typical county zoning ordinance are included in the Appendix.

Microfilm copy of complete manuscript of 256 pages, \$3.20. Enlargements 6" x 8", 10¢ per page.

SYSTEMS OF FARMING ADAPTED TO HIGHLY-PRODUCTIVE LEVEL LAND IN ILLINOIS

(Publication No. 4017)

William Neil Thompson, Ph.D.
University of Illinois, 1952

Illinois has over seven million acres of highly productive level land.¹ There is considerable confusion and uncertainty among research and extension workers, farm leaders, and farmers as to how this land can be used in a manner consistent with the goal of high earnings of farmers and the goal of soil conservation of both the individual farmer and society.

The specific objectives of this investigation in eliminating a portion of the confusion and uncertainty were as follows:

1. To bring together the agronomic and economic principles of importance to the farm manager who makes the decisions concerning the use of the land.
2. To separate the facts known about the use of highly productive level land from those that are not known.
3. To establish the comparative advantage of different systems of farming on highly productive level land in Illinois.
4. To study the results of alternative systems of land use in terms of the economic rewards to farmers and in terms of the level of soil conservation which each permits.
5. To set up recommended systems of land use for high-quality land.

This study was made within the framework of the principle of comparative advantage and those agronomic and economic principles that are important to the farmer on the quality of land under study.

Analysis of the comparative advantage of Illinois farmers on high-quality land showed that there will be heavy, and perhaps increasing, demands on these farmers to supply grain crops for feed, food and industrial uses, and exports. This quality of land is very limited in the United States. Illinois is located toward the east edge of the feed grain surplus producing area of the United States and is bordered on the east and southeast by huge feed deficit areas. There are established patterns of grain farming and grain marketing in the area, and grain processing plants are located both within and near the area. The tenure pattern of the area, sizes of farms, and lack of farmer experience with livestock will contribute to many farms continuing to be organized as cash-grain farms. However, farmers who have the ability to efficiently convert feeds to livestock and livestock products, and have labor and capital, will find that livestock organizations will be profitable.

An economic analysis of rotation experiment results, as they are applicable to a grain farming situation, showed that standover legume rotations result in lower earnings from the cropping system than are obtainable by adopting a rotation in which catch crop legumes are used.

The budgeting approach was used to study the effectiveness of alternative combinations of crops in the

rotation with and without nitrogen fertilizer. The results indicated that a combination of a balanced fertility program and rotations with two thirds of the land in intertilled crops and one third in small grain and legume catch crops results in fertility maintenance and high net earnings.

The transition from a continuous corn and soybeans rotation without fertilizer to a catch crop legume rotation can be made without sacrificing net earnings from the cropping system during any year of the transition. This transition was made by applying sufficient fertilizers for large yield responses and by applying them only where they were needed in the rotation. The corn-corn-oats(clover) rotation is very profitable during the transition period because corn is a high-profit crop and responds particularly well to a balanced fertility program on a depleted farm with deep, well-drained, permeable soils.

¹Land with productivity indexes ranging from 81 to 100, according to the Illinois system of rating soils, and with slopes of less than two percent.

Microfilm copy of complete manuscript of 243 pages, \$3.04. Enlargements 6" x 8", 10¢ per page.

LIVESTOCK MARKETING PROBLEMS IN SOUTHERN ILLINOIS

(Publication No. 4020)

Walter Joe Wills, Ph.D.
University of Illinois, 1952

For a better understanding of livestock markets and marketing in Illinois, certain characteristics of livestock must be recognized. Livestock is perishable, grade standards are subjective, marketings are in small numbers at one time, and many farmers prefer to sell near the farm. Markets need to be flexible to handle the various market classes, grades, and species of livestock as there are wide seasonal variations in volume marketed, as well as variations over time.

Over 90 percent of the cattle consignments are five head or less; nearly 70 percent of the hog consignments are ten head or less.

Various types of markets are available; terminal public markets, local markets, auctions, traders, and other farmers. A survey in 1950 indicated more livestock is sold through terminal markets than through any other type market. Local markets were more important for hogs than for any other species. Both auctions and traders were more important market outlets for cattle than for hogs.

Larger shipments of livestock are more generally sold through terminal markets than are smaller shipments. The extent to which differences in marketing methods have developed both between areas and species are due to differences in (1) methods of buying and selling; (2) types of production; and (3) concentration of livestock.

Methods of improving livestock income

Farm income from livestock sales can be increased by (1) selling at the seasonal high for the particular weight, grade, and class of the species; (2) improving livestock quality; and (3) reducing marketing costs. This last method has the least possibility of increasing total farm income but for individuals there are inequities in costs to be corrected. Transportation is the largest single expense item. Per hundred transportation charges are higher for calves and sheep than for cattle and hogs. Selling costs at an auction are higher with present (1950-51) prices than at terminal markets, especially for cattle and hogs.

Local slaughter in the area.

Local slaughterers kill the equivalent of about one-third of the cattle and one-fourth of the hogs produced in the area. Over half of the beef and about three-fifths of the pork consumed in the area are slaughtered elsewhere. Many problems will keep local slaughter from increasing rapidly. There are no federally-inspected slaughter plants in the area. The various cuts of meat are not produced in the same ratio as they are consumed, so if more slaughtering is done, a different sales organization is needed. Brokers have not been effectively used to sell differentiated meat products. The most profitable meat firms in the United States are the nonslaughtering processors, which indicates that the profits in this business are in processing differentiated products.

Suggested plans for improving marketing in area

Two alternative proposals are made to a solution of the marketing problems in the area (1) use existing marketing institutions and (2) establish a cooperative local market-auction combination.

For an auction to be a success it should avoid becoming a traders' clearing house; measures should be taken to prevent spread of livestock disease and a reasonable price level should be assured.

Livestock market education is more needed in the area than a new market. Such an educational program should include (1) more information on alternative market outlets; and (2) an understanding of the various marketing functions; and (3) adequate market information.

Southern states offer a potential market outlet for slaughter livestock from this area during certain seasons of the year.

Marketing problems cannot be solved by establishing new markets unless marketing functions are not now being performed or existing markets are inefficient.

Microfilm copy of complete manuscript of 170 pages, \$2.13. Enlargements 6" x 8", 10¢ per page.

THE USEFULNESS OF CRITICISM IN ACCOUNTING

(Publication No. 4021)

Glen Givens Yankee, Ph.D.
University of Illinois, 1952

The purpose of this study is to analyze current criticisms of accounting in an attempt to determine why the criticisms have appeared, whether a basis for establishing their validity can be found, what use the profession has made of criticisms in the past, and of what future use criticisms may be in the development of the profession of accounting. The study is justified in the fact that by learning how to use the techniques of criticism, public accounting can find one more means of becoming a full-fledged, mature profession as have medicine and law with philosophies of their own.

In the first part of the study it is shown that some criticism is inevitable from the dynamic nature of the modern business world in which the accountant works. It is an area of ever changing forces resulting from interacting interests in which the accountant has many masters all demanding concurrent service. This is followed by a discussion of the general nature of criticism based upon philosophical analysis. Here criticism is defined as a discriminating choice between alternates resulting from logical analysis based upon experience and knowledge of the causes and consequences of the alternates being compared.

Another section of the study is then devoted to a presentation of the reasons for the appearance of criticisms of accounting. The sources of criticism may be found inside or outside the profession. Examples of each of these sources are given.

This is followed by a classification of examples of specific criticisms. The first division of this classification involves criticisms of accounting ideas, classified under four main headings: the common denominator, accounting doctrine, accounting principles, and the technology of accounting. The second division involves criticisms of audit practice, classified under five main headings: general distrust, services performed, the public accountant's responsibility for service, auditing doctrine, and interpretation.

Another section of the study is devoted to consideration of possible measures of the validity of criticisms which include: general acceptance, authoritative opinions of outstanding accountants, laws, and the opinions of the users of financial information. None of these alone will form an acceptable measure of validity. From an analysis of the whole body of accounting theory and practice it is possible to determine what seems to be the primary purpose of accounting. The validity of any proposition may be tested by relating it logically to the stated function. Any criticism which points out a conflict with this central theme would be a valid criticism. For the purpose of this analysis a composite of the consensus of other writers was accepted, which is:

"The primary purpose of accounting is to furnish

useful information about the economic activities of a business enterprise, which information has income determination as its focal point."

This discussion is followed by examples of the way in which specific criticisms might be tested by relating them logically to the stated central theme. The first involves criticisms of the use of recorded dollar cost as a common denominator for expressing enterprise transactions; and, the second involves criticisms concerning the public accountant's responsibility for service. A further discussion considers the public accountant as a critic and the ways in which his approach to criticism may be criticized.

In conclusion it is shown that through professional introspection and discussion and debate brought about by critical remarks from people outside the profession, criticism has been one of the real tools by which the accounting profession has reached its present stage of development. It is only through the continued use of the techniques of good criticism that accounting can advance to the position of mature profession.

Microfilm copy of complete manuscript of 279 pages, \$3.49. Enlargements 6" x 8", 10¢ per page.

AN EVALUATION OF FREELY-FLUCTUATING EXCHANGE RATES

(Publication No. 4253)

Leland Bennett Yeager, Ph.D.
Columbia University, 1952

Proposals for monetary-fiscal policy to stabilize national prosperity independently of foreign developments run up against the inconvenient fact that three widely-accepted objectives — independent national monetary-fiscal policies, private multilateral world trade free from controls designed to force balance-of-payments equilibrium, and fixed exchange rates — are compatible with one another only temporarily, at best. So it is worthwhile to examine the possibilities of sacrificing fixed exchanges and permitting completely free fluctuations.

Examination of the supposed objections to fluctuating exchanges yields conclusions that may be baldly condensed as follows: (1) The import-and-export demand-and-supply elasticity requirements for stable equilibrium in the exchange market are not very exacting. Considering the competitive supply by many countries of many internationally-traded goods, the competition between domestic and imported goods, and the implications of the purchasing-power-parity doctrine, the requirements are almost sure to be satisfied under conditions of relatively unrestricted trade. In fact, there must, of logical necessity, exist some exchange value of a country's currency at which equilibrium would be stable. (2) Currency overvaluation has poor prospects as a method of improving a country's terms of trade. (3) Since the purchasing power of a currency depends on the demand for and supply of cash balances, exchange rates do not govern national price levels in such a way as to make domestic monetary

stabilization impossible. (4) Destabilizing speculation in free exchanges is likely to be a serious problem only when price-level relationships among countries are changing so sharply that uncontrolled fixed exchanges would not work, either. (5) The risk of exchange-rate fluctuations, though in itself doubtless a deterrent to trade, is probably outweighed by the stimulus to trade of exchange rates freely tending toward equilibrium and by the lack of necessity for trade controls to force balance-of-payments equilibrium. Besides, forward-exchange facilities enable traders to get rid of all or most of any exchange risk. (6) Exchange risk in net international lending cannot be similarly eliminated. However, free exchanges have this defect only in comparison with a genuinely international monetary system assuring permanently fixed exchange rates, for fixed-but-adjustable exchanges present the same sort of risk in international lending. Besides, international equity investment, and particularly direct investment, might not be much impaired by the risk of exchange-rate fluctuations.

Reconsideration of supposed experience with the defects of free exchanges shows that free exchanges have been blamed for working poorly under conditions under which fixed exchanges could not work at all.

Alternatives to free exchanges have real defects of their own. An enduring gold standard precludes independent national monetary-fiscal policies and requires the clumsy price-and-income-level mechanism of balance-of-payments adjustment in place of the more selective and less painful exchange-rate mechanism. The system of fixed-but-adjustable exchanges has serious disadvantages in connection with the prolongation of maladjustments, the inadequacy of foreign-exchange reserves, the difficulties of setting new exchange rates, and the opportunities for "sure-thing" speculation. Neither exchange equalization accounts nor controls over capital movements and speculation seem much likelier to provide a happy compromise between fixed and free exchanges.

Consideration such as these by no means imply that free exchanges are the only sensible policy under all circumstances. Rather, a fluctuating exchange value for a currency appears as one strand of policy that permits a country to undertake independent domestic stabilization measures.

Microfilm copy of complete manuscript of 475 pages, \$5.94. Enlargements 6" x 8", 10¢ per page.

EDUCATION

TRENDS IN THE DEVELOPMENT OF THE PROGRAM OF HIGHER EDUCATION IN THE AUGUSTANA LUTHERAN CHURCH

(Publication No. 4155)

Gustav Kenneth Andeen, Ph.D.
Columbia University, 1952

The Augustana Lutheran Church carries on a program of higher education by training theological stu-

dents at the Augustana Theological Seminary in Rock Island, Illinois, and by conferring baccalaureate degrees at four liberal arts colleges, Augustana in Rock Island, Illinois; Bethany in Lindsborg, Kansas; Gustavus Adolphus in St. Peter, Minnesota; and Upsala in East Orange, New Jersey. Luther College is also an academy and junior college of the church located in Wahoo, Nebraska. The purpose of the study has been to give an historical background of these schools, to analyze the educational developments, and to note the issues which have arisen, in order to provide material for a current evaluation of their work and to gain historic perspective in projecting the future program of higher education in the church.

The historical method of research was employed in making the study. Visits were made to each campus where access was permitted to the archives of the schools. The most valuable material was found in the minutes of the college boards, the faculties, and various organizations, together with college catalogs and other published material; such as, school papers, annuals, and literature pertaining to school life. Administrative officers made available previous studies of students, alumni, curriculum, and school activities. It is only within the past few years that any concern has been evidenced in keeping detailed records in most instances, and, therefore, much information that would be valuable and helpful has not been kept.

Following an historic survey of each school, the general and specific aims and purposes were studied as they have developed through the years. It became clearly evident that these colleges are not only church-related, they are church colleges. This was also seen in the study of the jurisdiction and control of the institutions, which indicated that the colleges are kept securely in the hands of the church. Control is maintained through constitutional provisions and in the election of Board members, who must be members of the Lutheran Church elected by the various conferences of the church and responsible to the church.

Educational information was gathered and trends recorded in the analysis of the faculties, students, curriculum, finances, location, and physical plants of the schools. One chapter also considers the relation of the schools to the church. A final statement is made concerning the basic issues which face the church as it continues its endeavors in the field of higher education.

With the crises in private and denominational education becoming more acute because of financial needs and the competition of state universities in attracting the students, the church must continually evaluate its program in relation to its ability in continuing the educational work and to its willingness in making sacrifices for the educational program, if it considers this aspect of church life necessary to its mission. This study should assist in making this evaluation and also be a contribution for the historical records of one phase of American higher education.

Microfilm copy of complete manuscript of 270 pages, \$3.38. Enlargements 6" x 8", 10¢ per page.

**THE SOCIOLOGY OF TEACHING I:
A STUDY OF PARENTAL ATTITUDES
TOWARD THE TEACHING PROFESSION**

(Publication No. 4041)

William Fredrick Anderson, Ph.D.
State University of Iowa, 1952

The present investigation was designed to study parental attitudes toward the teaching profession and the occupations which comprise this profession. Special reference was given to the following parental attitudes.

1. The prestige accorded the teaching occupations by parents of different socio-economic status.
2. The attitudes of parents of different socio-economic status on the importance of the teaching occupations to their city.
3. The ratings of suitability of the teaching occupations for sons and daughters of different socio-economic status.
4. The ratings of the desirability of the teaching occupations for sons and daughters of different socio-economic status.
5. The ratings of the advantages and disadvantages of the teaching occupations as expressed by parents of different socio-economic status.

A questionnaire was constructed to facilitate the obtaining of parental attitudes toward teaching.

Data for the investigation were collected by contacting parents of tenth grade students of Cedar Rapids, Iowa Public Schools. Each of the 666 students was tentatively classified as to socio-economic status on the basis of occupation of father and dwelling area and placed in one of the following social classes: upper, upper-middle, lower-middle and lower. From each list a randomly drawn sample was selected until sixty parents from each of four social classes had completed the questionnaire.

Each family selected was contacted personally; this interview had as its aim the establishing of sufficient rapport to bring about completion of the questionnaire and the obtaining of information needed to complete the estimate of social class.

Social class of the parents was estimated by use of the Index of Status Characteristics developed at The University of Chicago by Warner, Meeker, and Eells.

Conclusions

1. The prestige accorded the teaching profession by all four social classes was high.
2. The mean occupational prestige ratings were approximately the same for each of the four social classes.
3. Parents judged their sons significantly better suited for high school teaching than for grade school and college teaching, and their daughters better suited for grade school teaching than for college and high school teaching.
4. Parents belonging to the upper and upper-middle classes judged their sons significantly better suited for college, high school and grade school teaching than did the parents of the lower class.

5. Mothers of the upper class judged their daughters significantly better suited for the three teaching occupations than did the mothers of the lower-middle and lower classes.

6. Parents of the lower class rated certain mechanical occupations most highly suited for their sons, and certain clerical occupations most highly suited for their daughters.

7. Parents belonging to the upper and upper-middle classes judged the teaching profession more desirable for their sons and daughters than did the parents of the lower two classes.

8. The nineteen parents, of children with high academic achievement and of low socio-economic status, rated college, high school and grade school teaching as approximately average in suitability for their sons and daughters. The teaching occupations were rated highly desirable by these parents. Fifteen of the nineteen parents rated high school teaching as very highly or highly desirable, thirteen parents rated college teaching highly desirable, and ten parents rated grade school teaching as highly desirable for their sons and daughters.

9. The parents of students with highest academic achievement rated the professional occupations more highly suited for their sons and daughters than did the parents of students with comparatively low academic achievement.

10. Parents of all four social classes rated the opportunity to work with young people and the importance of the teaching occupations to be the biggest advantages of the teaching profession. The lowness of the income of teachers, in comparison with other professions, is the biggest disadvantage.

Microfilm copy of complete manuscript of 185 pages, \$2.31. Enlargements 6" x 8", 10¢ per page.

**FOLLOW-UP IN TEACHER EDUCATION:
A STUDY OF ISSUES CONCERNING FOLLOW-UP
OF TEACHER EDUCATION GRADUATES,
UNIVERSITY OF ILLINOIS**

(Publication No. 3989)

Carl Harmond Baumgardner, Ed.D.
University of Illinois, 1952

The problem area of follow-up and in-service relations with teacher education graduates of the University of Illinois was explored in order to set forth and analyze issues relative to the potentialities and problems of teacher follow-up and to aid in the formulation of a rationale for the follow-up of teacher education graduates of the University of Illinois.

Methods of investigation included analysis of literature on the subject of teacher follow-up, study of factors pertaining to the University's work in teacher education and its relations with teacher graduates, and surveys of opinion among persons involved in training and supervising teacher graduates of the University.

Two questionnaire forms were constructed for use in assessing opinion concerning follow-up of teacher

graduates. The initial questionnaire, entitled "An Opinionnaire on Follow-up Services," proposed twelve general follow-up activities for which support is found in the literature. A total of 691 selected faculty members of the University of Illinois, administrators of public schools in the state of Illinois, and teacher graduates of the University were asked to contribute opinions, criticisms and suggestions concerning these proposed follow-up activities. Seventy per cent of these persons responded to the opinionnaire.

A second questionnaire, entitled "An Inquiry Concerning the Follow-up of University of Illinois Teacher-Training Graduates," proposed eleven aims and thirteen procedures of follow-up work by the University. Data obtained through use of the initial questionnaire were utilized in formulating the twenty-four proposals presented in the inquiry form. Nearly 82 per cent of the 273 University of Illinois faculty members, school administrators in Illinois, and teacher graduates of the University who were selected to receive the inquiry form participated in the study by responding to the questionnaire.

Conclusions based on the findings of the study concern the potentialities and problems of both research-oriented follow-up and service-oriented follow-up of teacher education graduates, University of Illinois.

Results of the study indicated that the potentialities of follow-up as a medium by which insight can be gained into the work and welfare of teacher graduates, are greatest in connection with guidance of students enrolled in the pre-service training program in education, evaluation and revision of pre-service training experiences, provision of placement services for teachers, and research into problems which are of general concern in the education profession. That the University of Illinois should remain continuously aware of how graduates fare in their work as teachers and should utilize this knowledge in connection with the program of guidance for undergraduate students in education, in sustained critical analysis of the objectives, content and organization of the teacher education program, and in teacher placement work was stressed in the responses of the more than seven hundred University of Illinois faculty members, school administrators, and teacher graduates who participated in the study.

That the administrative and supervisory personnel working in the local schools constitute the primary source of guidance and assistance for beginning teachers was generally recognized by persons who participated in the study. However, considerable support was shown for service-oriented follow-up, employing procedures which would not necessitate commitment to or involvement in an extensive program of visitation and on-the-job conferences with teacher graduates. Several ways in which the University of Illinois might contribute, through service-oriented follow-up, to the successful induction of its teacher graduates into the profession of teaching were suggested in the responses to the questionnaires. Respondents endorsed the use of information circulars, newsletters, and personal contacts with

graduates at conferences and institutes and during visits to schools, as means by which the University could extend assistance and encouragement to teacher graduates.

Microfilm copy of complete manuscript of 229 pages, \$2.86. Enlargements 6" x 8", 10¢ per page.

COMPARISON OF A TACHISTOSCOPIC PRESENTATION WITH A CLASSROOM METHOD OF TEACHING THE BASIC MULTIPLICATION FACTS

(Publication No. 4046)

Randall Robert Bebb, Ph.D.
State University of Iowa, 1952

It was the purpose of this study to examine by comparison two methods of teaching the basic facts in multiplication. Group I was the experimental group which used the tachistoscopic method as the fundamental procedure for learning the 81 basic multiplication facts. Group II was the control group which used a more-or-less typical classroom study method. This experiment took five days (Monday through Friday) with a forty-minute daily class period for each section being taught. Both Groups I and II were given the same initial test on Monday and final test on Friday. The only difference in procedure used with the two groups was in the method of teaching. In all, nine third-grade classes participated in this study giving a total of 222 cases (137 experimental and 85 control cases). The writer did all the teaching in both methods. This was to help eliminate the teacher variable.

Third grade children were chosen as subjects in this study because the meaning of the multiplication concept would have already been taught, yet not all of the multiplication facts would have been presented to them. At the time this study was made (April through May 16, 1952), six third-grade classes had completed the 3's and three third-grade classes had completed the 4's.

The data obtained in the present study appear to support the following generalizations, subject to the conditions of this study.

1. The findings throughout the entire study showed that Group II (Control Group) pupils consistently made a greater mean gain in multiplication facts learned than did Group I (Experimental Group) when their final and initial test scores were compared. Since the only difference in procedure used with both Groups I and II was in the method of teaching, and since this greater mean gain made by Group II was found to be statistically significant at almost the .1 per cent level of confidence, it can be assumed that this greater gain was due, in a large degree, to the method of study used with the Control Group.

2. There were no significant gains made at any one level of ability over another as judged by the initial test.

3. Since Group I, the group using the tachistoscope,

did make a significant mean gain within its own group, it would seem to imply that tachistoscopic training of the proper sort might increase interest, obtain for a reasonable length of time a high degree of attention, and certainly give a variety to the learning program. This is true, even though the tachistoscopic method was found to be a less efficient one than that used with Group II.

Microfilm copy of complete manuscript of 86 pages, \$1.08. Enlargements 6" x 8", 10¢ per page.

**A COMPARISON OF BRIGHT AND DULL
CHILDREN OF COMPARABLE MENTAL AGES
WITH RESPECT TO VARIOUS
READING ABILITIES**

(Publication No. 4049)

Emery P. Bliesmer, Ph.D.
State University of Iowa, 1952

The purpose of this study was to compare dull and bright children with comparable estimated true mental ages with respect to each of several abilities involved in reading comprehension. The specific abilities investigated were:

1. Word Recognition.
2. Word Meaning.
3. Memory for Factual Details.
4. Location or Recognition of Factual Details.
5. Perception of Relationships Among Definitely Stated Ideas.
6. Recognition of Main Ideas.
7. Drawing Inferences and Conclusions.

Measures of Listening Comprehension and Reading Rate were also obtained.

The particular abilities investigated were selected as a result of (1) study of various sources for suggestions of abilities involved in reading comprehension, and (2) consideration of availability or adaptability of appropriate measuring instruments and purported importance of given abilities.

Subjects used were selected from the public schools of a large Iowa city. The criterion for "dull" was an estimated true IQ of 84 or below; that for "bright", one of 116 or above. Results obtained with the Revised Stanford-Binet Scale were used in selecting subjects. For the dull group, pupils 14 years of age or older, in two junior high schools, were selected and tested until there was obtained a sample of twenty-nine children with:

1. Estimated true IQ's of 84 or below.
 2. Estimated true MA's of from 10 years, 7 months, through 12 years, 6 months.
- For the bright group, third and fourth grade children 10 years of age or younger, in three elementary schools, were tested until a sample meeting the following specifications was obtained:

1. Estimated true IQ's of 116 or above.
2. Estimated true MA's of from 10 years, 7 months, through 12 years, 6 months.
3. As many bright children in each of four six-

months MA intervals, constituting the range in the preceding specification, as there were dull children in that interval.

The final sample contained twenty-eight children in each of the groups.

Adaptations of various forms and batteries of the Reading Comprehension Test of the Iowa Tests of Basic Skills were made to obtain measures of Word Meaning, Memory for Factual Details, Perception of Relationships Among Ideas, Recognition of Main Ideas, Drawing Inferences and Conclusions, and Listening Comprehension. Adaptations of the above test and part of the Durrell Analysis of Reading Difficulty constituted a test of Word Recognition. The Reading Rate test utilized a 1500-word selection of fourth to fifth grade level of difficulty.

The method of sampling employed was one which would permit a statistical analysis of results appropriate for a "groups by levels" design. For each ability, the hypothesis tested was that the means of the populations of which the dull and bright groups were representative samples were the same. A 5 per cent coefficient of risk was employed in rejecting the null hypothesis.

Obtained differences favored the bright group with respect to all abilities except Word Meaning. Significant differences were found for Listening Comprehension and for total comprehension ability and for the following specific abilities: Location or Recognition of the Factual Details, Recognition of Main Ideas, and Drawing Inferences and Conclusions. Differences for Memory for Factual Details and Perception of Relationships Among Definitely Stated Ideas were not significant at the required level but were substantial enough to indicate that further research might reveal significant differences. Obtained differences for Reading Rate, Word Recognition and Word Meaning were not significant. Results obtained suggest that dull and bright children of comparable mental ages, within the IQ and MA ranges of this study, tend to be alike with respect to the less complex or somewhat mechanical skills involved in reading comprehension but that bright children are superior with respect to the more complex reading comprehension abilities.

Microfilm copy of complete manuscript of 159 pages, \$1.99. Enlargements 6" x 8", 10¢ per page.

**A GUIDE FOR A COURSE IN UNITED STATES
HISTORY FOR PROSPECTIVE HIGH SCHOOL
TEACHERS OF HISTORY**

(Publication No. 3983)

Richard Langworthy Burdick, Ed.D.
Florida State University, 1952

Present-day economic, social, political, and international difficulties indicate the need for better overall education in all phases of democratic citizenship. United States history courses, because of the relationship of the material with which they deal to the basic problems of citizenship education, have received enough

criticism and are the subject of many suggestions from various sources.

The study is limited in scope to the course in United States history commonly required in the pre-service education of future teachers of high school history. The purposes of the study are: (1) to set forth the philosophical and psychological bases which, considered in relation to the other factors in the total cultural environment, should provide the foundations for the development of criteria for a United States history course for future history teachers in secondary education; (2) to develop such criteria and to set up in general terms some suggestions as to methods and techniques of instruction which will meet these criteria; (3) to show how the application of the methods proposed may be instrumental in helping to overcome the lag between practice in teacher education and needs of secondary school history teachers. The latter purpose is implicit in the first two and is so treated to avoid redundancy.

From many roots a value system nurtured by a friendly environment has evolved into the American democratic philosophy which recognizes the inherent worth and dignity of the individual, the reciprocal individual-group responsibility in matters of common concern, and the efficacy of the method of human intelligence or problem-solving. Accepted in the study is that theory of learning which recognizes learning as the reconstruction of experience through the interaction of the total organism with its environment. The type of learning experience thus to be fostered is that in which the individual through the process of reflective thinking solves problems and develops that attitude toward the dilemmas of the modern age which will aid him in becoming a more effective democratic citizen.

The implications of these philosophical and psychological bases take on more meaning through the consideration of the cultural setting in which education must function. The democratic theory and cultural realities demand changes in secondary education, in general, and in United States history courses or core programs relying heavily upon the materials of American history. In a similar manner there is a demand for improved practices in teacher education.

It is suggested that one way in which some improvement in the preparation of high school teachers of history might be achieved would be to emphasize the problem-solving method, the importance and nature of pre-planning including the use of resource units, and to consider suggested criteria for such a college course. There are also suggested some basic, persistent problems which might well become the subjects of resource units and which could become the points of consideration about which a more meaningful course in United States history might be built. The process by which the material of United States history is handled in teacher education is very important because of the tendency of teachers to teach as they have been taught, not as someone has told them to teach.

The construction and use of resource units is shown to be a means of implementing the philosoph-

ical and psychological bases. Included in the study is a sample resource unit constructed around the problem, "What Should the Concept of Democracy Mean to the American People?"

Microfilm copy of complete manuscript of 413 pages, \$5.16. Enlargements 6" x 8", 10¢ per page.

A STUDY OF THE USE OF THE PROBLEM-SOLVING APPROACH IN INDUSTRIAL ART PROGRAMS IN FLORIDA SECONDARY SCHOOLS

(Publication No. 3984)

Clyde Edwin Burns, Ed.D.
Florida State University, 1952

The ability to cope intelligently with problems of the physical and social world has been recognized increasingly as a vital personal-social need in a world characterized by inevitable and rapid change. Within the past thirty years the development of such ability has been recognized as a primary task of the public schools. Recently conducted experiments showed that instructional techniques based on the problem-solving process are superior in the acquisition of usable information, in transfer of past experience to the solving of new problem situations, and in the development of critical thinking ability.

The characteristics of this process were carefully summarized into statements descriptive of problem-solving as an educational approach — the organization of methods and techniques by which problem-solving ability is most effectively developed. Based on these characteristics as criteria, instruments were constructed for obtaining evidence about the extent to which such an educational approach was being used in industrial arts education in Florida public white junior and senior high schools.

Questionnaires were sent to all industrial arts teachers in Florida secondary schools. Based upon the scores from these returns, a sampling of twenty-two teachers was selected for visitation and use of an interview check-sheet for recording information to follow-up the original instrument. Questionnaires were administered to all of the industrial arts pupils of the teachers visited. Results from all three sources were converted into patterns and compared on a scaling system. Revisions were made in conflicting patterns obtained from the teacher questionnaires on the basis of the visitation.

Evidence from all three instruments indicated that industrial arts teachers were making a successful effort to secure and hold pupil-interest through the projects selected. Failure to go beyond interests of pupils to some of the more persistent concerns originating outside of the schools was apparent, since immediate interest was often accepted as synonymous with a personally-challenging problem-situation.

Much of the plan-making involved no formulation of hypotheses for the solution of a problem. It was a

requirement by the teacher to assure orderly development of a project, to anticipate material needs, and to provide the teacher visual evidence of the pupil's proposed activity. The making of a plan was usually secondary in importance to the construction of the project.

The freedom with which pupils were permitted to select tools and materials for working out problems was generally more limited than the problem-solving approach demands. Many of the techniques were dictated by class size, demand for finished appearance, or for reasons other than the development of problem-solving ability.

The most frequent technique by which pupils gained information in industrial arts was a demonstration by the teacher of a series of units, supplemented by teacher-supplied answers to questions raised by the pupils during work on projects. Very few teachers depended on the pupils to initiate the search for information as need was revealed through pupils' development of projects.

Organization and functioning of a personnel system was generally not regarded by teachers and pupils as a cooperative problem in living together.

Predominant techniques in evaluation were teacher explanation of grading system, solicitation in some instances of pupil-opinion regarding deserved grades, and assignment of grades without further consultation or assistance by pupils.

Development of problem-solving ability was not of primary concern for most Florida industrial arts teachers in the selection of instructional techniques. Most-common practice was the use of techniques of all levels of excellence, with a tendency toward most-frequent use of mid-level practices. Very few teachers were doing an outstanding job in the development of problem-solving ability through the approach described in this study.

Microfilm copy of complete manuscript of 252 pages, \$3.15. Enlargements 6" x 8", 10¢ per page.

A STUDY OF DIRECTED STUDY IN SELECTED HIGH SCHOOL SUBJECTS

(Publication No. 4051)

Richard W. Burns, Ph.D.
State University of Iowa, 1952

Many professional textbooks in education emphasize the importance of study in the learning process. In recent years the terms "directed study" and "supervised study" have been used in connection with the newer ideas of what should constitute good methodology in teaching. Directing study, as a technique has never been clearly defined. In practice, directing study implies a cooperative teacher-pupil activity, whereby the teacher provides the student with the opportunity to develop and use correct study techniques in meaningful, learning situations.

The literature does not report any experiment designed to show what effect the combined use of

several study techniques, in a program of directed study, would have on subject matter achievement. One approach, in an effort to determine the value of directed study, involves the experimental study of a traditional assign-recite (non-directed) study method with a directed study method, and was undertaken by the author.

The specific purpose of this study was:

1. To determine if there is any significant difference in student achievement in high school subjects between two groups, when one group works under directed study and the other group works by non-directed study.

2. Is there any significant difference in student achievement in high school subjects among students of different ability levels, when one group works under directed study and the other group works by non-directed study.

3. Does directing study produce evidence of any desirable results, other than achievement, such as: increased interest, better motivation and better daily preparation of students for their daily class-work.

Four classes, two in eleventh-grade English and two in tenth-grade biology, in University High School, Iowa City, Iowa, were chosen for experimental study. In each subject pair of classes, one class served as a control section (A), using non-directed study methods, and one class served as an experimental section (B), using directed study methods.

Two methods of evaluating this study were used; namely, a log containing the subjective evaluation of the classes as observed by the subject teachers, and an objective method, using standardized tests, for determining achievement level. The mean scores made by the A and B sections, in both subjects, were compared by the method of analysis of covariance. A second statistical treatment, a modified treatments by levels design, was imposed on the data to test the tentative hypothesis that the experimental method did not differ in its effectiveness for pupils of different levels of ability as determined from the initial scores.

The conclusions of this study are as follows:

1. Neither directed nor non-directed study is significantly superior to the other in producing greater achievement in biology or English.

2. Neither directed nor non-directed study is significantly superior to the other in producing greater achievement in biology or English at any of the selected ability levels.

3. Directed study is probably superior to non-directed study in producing greater interest, in motivating and helping students to better prepare their daily lessons, in both biology and English.

The findings of this study do not disprove the value of directing study, but they do suggest that some reservations should be placed on the extravagant claims that are often made in its behalf for students at all age and grade levels.

Microfilm copy of complete manuscript of 290 pages, \$3.63. Enlargements 6" x 8", 10¢ per page.

AN ANALYSIS OF CERTAIN FACTORS WHICH
AFFECT STUDENT ATTITUDES TOWARD A
BASIC COLLEGE COURSE, EFFECTIVE LIVING

(Publication No. 4036)

Laurence Samuel Cooke, Ed.D.
Michigan State College, 1952

This investigation was undertaken to ascertain the affect of certain factors on student attitudes towards the Effective Living course. Fifteen hypotheses were formulated and tested concerning the affect of these factors.

The principal instrument used for this purpose was A Scale to Measure Attitudes Toward Any College Course. This 21-item Thurstone scale was constructed by the Board of Examiners at Michigan State College. Appropriate tests of reliability and validity were made.

The 1,579 students used in this investigation were those enrolled during the Fall, 1951 in the first term course of Effective Living, Basic 151. The attitude scale and Michigan State College's Teacher Evaluation Sheet were administered to the entire group. Also included in the investigation were sixteen instructors teaching forty-seven Basic 151 classes. Data secured from eight-hundred and fifty students selected from the larger group were used in testing most of the hypothesis.

Appropriate use of the F-test and T-test were made in determining whether one group of students could be considered significantly more favorable towards the course than another group.

The effect of the size of the home community on the students' attitudes toward the course was found to be of no significance; nor was the education of the father a significant factor. However, it was found that students whose fathers were engaged in the professions and allied fields were more favorable toward the course than were students whose fathers were employed in the skilled, semiskilled, and unskilled trades.

No significant difference was found when the attitude scale was administered by the instructor or by a student in the class; but students who signed their names to the scale expressed a more favorable attitude towards the course than did students who were asked not to sign their names.

In comparing the attitudes of students toward the course with their evaluation of their instructor's ability as a teacher, it was found that students who were most favorable toward the course tended to express a higher evaluation of their instructor. It was further discovered that the instructor who received the highest rating from his students and whose students rated the course most favorably was a full-time, experienced teacher; and that the instructor whose students rated him low and were also unfavorable towards the course was a part-time, inexperienced teacher.

Students in small discussion classes were more favorable toward the course than were students in large lecture classes.

No significant difference was found between the

attitudes of the male and female students.

Social science majors were found to be more favorable toward the course than were natural science majors and non-preference students.

Although the attitude scale was administered before the final grades were announced, students receiving A's and B's were found to be more favorable toward the course than were the students who received D's and F's.

It was also discovered that students who had expressed a favorable attitude toward the course were higher in the linguistic abilities as measured by the ACE than were students who had expressed the unfavorable attitude. No significant difference was found between the favorable and unfavorable students in the quantitative area.

Microfilm copy of complete manuscript of 149 pages, \$1.86. Enlargements 6" x 8", 10¢ per page.

AN APPRAISAL OF SCHOOL IMPROVEMENTS
RESULTING FROM THE USE OF THE
EVALUATIVE CRITERIA IN SELECTED
HIGH SCHOOLS IN TENNESSEE

(Publication No. 4152)

Quill Evan Cope, Ed.D.
New York University, 1952

The Problem

The purpose of this investigation was to appraise school improvements that may have resulted from the use of the Evaluative Criteria in selected high schools of Tennessee. The investigation dealt with improvements recommended by visiting committees, the status of the evaluated schools in 1951-52, and changes resulting from the evaluation program.

The Procedure and Treatment of Data

Normative-survey research methods were used in collecting data. The reports of forty-three visiting committees were analyzed and the findings summarized. A questionnaire was constructed based on information secured from visiting committee reports. Sources of data were: questionnaire replies from forty-two schools; interviews with teachers, principals, and administrative officials in fifteen schools; observations in fifteen schools; written evaluations by 219 teachers; and the professional literature.

Forty-two of the forty-three schools which had been evaluated since World War II replied to the questionnaire. These data were tabulated to determine what had been done about recommendations made by visiting committees. Case studies were made in fifteen schools. Separate interview schedules based on visiting committee reports were constructed for each school. Observations were made and interviews were conducted in each school. The findings for each school were presented under the headings: general character of the school; the evaluation program; the follow-up program; the outcomes of the program; faculty reaction to the evaluation program; and summary and

conclusions. A summary showed the significant findings from the fifteen case studies.

The Findings

The improvements reported most frequently were: 1. Curriculum: greater use of local resources, treatment of individual differences of pupils, and greater use of instructional materials; 2. Pupil activity program: the school club program, expansion of social activities, and expansion of musical activities; 3. Library services: more and better books, better coordination between the librarian and the staff; 4. Guidance services: more emphasis on vocational guidance, development of guidance materials, and emphasis on guidance as a major school function; 5. School plant program: major maintenance problems, addition of furniture and equipment, and improvement of the grounds; 6. Staff and administration: development of an in-service program, more supervision of instruction, and improvement of the health program.

The case study of fifteen schools showed that none of them had developed a comprehensive follow-up program which conformed to the suggestions outlined in the Evaluative Criteria. Eight schools showed little evidence of an organized improvement program, seven schools had made some effort to develop a follow-up program but only one of these was carrying out an intensive follow-up program.

The Conclusions

1. Teachers and principals considered the self-evaluation program which preceded the committee visit the most valuable part of the total evaluation program.

2. In the majority of the schools, classroom teachers were not satisfied with the evaluation of their teaching procedures.

3. Teachers tended to feel that the greatest value of the visiting committee was to motivate the staff of the school to make a thorough self-evaluation.

4. All schools have made some improvements in their program as a result of the evaluation program.

5. In most schools, very few significant improvements involving group planning can be attributed to the evaluation program.

6. The greatest values resulting from the evaluation program are probably those not easily observed or measured such as greater unity in the staff, more attention to the individual child, and a better understanding of the total school program as it is related to the community.

7. Efforts need to be made to improve the follow-up program and to emphasize this phase of the evaluation program.

Microfilm copy of complete manuscript of 325 pages, \$4.06. Enlargements 6" x 8", 10¢ per page.

THE EFFECTIVENESS OF THE INTERN PERIOD OF THE GEORGIA PROGRAM FOR EDUCATING SUPERVISORS

(Publication No. 4139)

Johnnye V. Cox, Ph.D.
New York University, 1952

It is the purpose of the Georgia program for the education of supervisors to develop competencies in selected prospective supervisors that will enable them to assume democratic leadership in helping teachers, administrators and other school personnel, and lay persons to bring about desirable changes in the total education of children. It is assumed, in the Georgia program, that participation in a democratically planned and executed program is one very effective way to learn democratic procedures. The supervisors in this program:

1. Share in developing the over-all policies of the program.
2. Share in determining their objectives and activities in terms of competencies which they need to develop.
3. Practice supervision in a real situation.
4. Participate in guided and planned study.
5. Participate in the evaluation of their outcomes.

It was the purpose of this study to appraise the effectiveness of the intern period in the Georgia program for the education of supervisors. The investigation included:

1. Developing and selecting procedures for determining changes in supervisors during the intern period.
2. Assessing the changes in supervisors during the intern period.
3. Making an analysis of findings and presenting recommendations for the improvement of the program.

The design of this study is of the "before and after" type. The status of each supervisor in the study was determined at the beginning and end of the intern period, in relation to certain major supervisory functions. Comparisons of the supervisor's status for the two periods indicated changes made by the supervisor during the internship. The data used in making the appraisal were collected from four sources:

1. Records, reports, diaries, and letters from supervisors who were being studied.
2. Records, reports, diary, and letters of adviser for the supervisors.
3. Observation records of four authorities in supervision.
4. Tests, check sheets, and inventories which were used with the supervisors at the beginning and end of the internship.

The data were analyzed according to procedures in a *Guide for Determining Status*, an instrument developed for use in this study. Each item in the data, that related to the major supervisory functions being investigated, was judged to determine the extent to which it "varied slightly," "varied moderately," or "varied considerably" from opinions of recognized authorities in supervision.

The judgments made of the materials of each

supervisor provided information for determining his status at the beginning and end of the internship, in relation to the major supervisory functions. A comparison of the supervisor's status for the two periods revealed the changes made by the supervisor during the internship.

It was concluded from the study that the intern period as it now functions in the Georgia program is effective. It is effective in helping supervisors to make significant progress toward the over-all objectives of the program. It is effective in helping supervisors to make significant improvement in their ability to perform certain major supervisory functions, and in helping them to make significant shifts in emphasis in the supervisory functions as the situation demands and/or as their skills permit. The intern period is most effective in helping supervisors to develop skills needed as resource persons, is much less effective in helping them to develop skills needed to identify problems, and is least effective in helping them to improve their teaching practices, although even here some improvement is evident.

It may also be concluded from this study that an intern experience will be effective for other school leaders, if planned in accord with the policies, plans, and procedures of the Georgia program for the education of supervisors.

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A COMPARATIVE SURVEY OF HEALTH EDUCATION IN PUBLIC SECONDARY SCHOOLS IN SELECTED SECTIONS OF THE UNITED STATES

(Publication No. 4060)

John Paul Dratz, Ph.D.
State University of Iowa, 1952

The Problem

One of the chief objectives of the study was to determine how the entire field of health education was being presented in one educational area, the public secondary school. The whole problem can be divided into three main areas insofar as this study is concerned. (1) Administrative; including such questions as whether hygiene is a separate course or is integrated with other subjects; semesters and periods devoted to teaching hygiene; the preparation of teachers and the coordination of hygiene with other subjects; and the total program of health education. (2) Procedures; including the use of supplementary aids in hygiene classes; subject areas covered in courses of hygiene; courses with which hygiene is integrated; use of physical examinations; and type of health service available. (3) Ratings and improvements, including ratings of administrators, suggested improvements for individual situations and factors limiting expansion of the present program.

If the foregoing questions are answered and evaluated against standards of good practice, a partial

picture of the present status of the programs of health education can be obtained.

Definition of Terms as used in this Study

Health education — denotes the total program of activities concerned with health in the school.

Hygiene — denotes the actual course of instruction in matters pertaining to health.

Procedure

A questionnaire was devised and sent to school administrators in six states in widely separated sections of the United States. The states included Montana, New Jersey, Iowa, Michigan, California and Florida. The administrators were selected at random from junior high schools and from senior high schools in the following school population groups; under 100, 100-199, 200-500, and over 500.

Standards for the evaluation of the replies to the questionnaire were established through a review of available literature on the subjects covered by the questionnaire.

Analysis and Summary of Replies to the Questionnaire

Administration

In general, the replies to the questionnaires revealed that the majority of the schools surveyed do not teach hygiene as a separate academic course in either the junior or senior high schools, and that when taught as a separate course, hygiene is taught one period a week for an average of one year of two semesters. New Jersey leads all other states on a comparative basis in the teaching of hygiene as a separate course in both junior and senior high school and in all population groups from which replies were received. In most instances where hygiene is a separate course it is a required subject for all students. Sufficient information on the training of teachers in hygiene was lacking to warrant a conclusion. The replies indicated that a few schools used a person trained in all aspects of health education as a coordinator of all school activities pertaining to health.

Procedures

A complete lack of uniformity insofar as the subject areas studied in hygiene were concerned is noticed. Conversely it seems to be a uniform practice to include the teaching of hygiene in the duties of the physical educator. The replies indicate that a minimal rather than maximal use is being made of supplementary aids in teaching of hygiene. Physical examinations in the schools are largely confined to those students participating in competitive athletics and in most states except Florida are conducted by a physician.

Suggested Improvements

The majority of schools offering hygiene on a separate course basis rated their total programs of health education higher than did those offering integrated hygiene. Few rated their total programs as being excellent or superior and needing no improvements.

More physical education and curriculum space as well as more finances and adequately trained teachers were most often cited as suggestions for improvement and also as limiting factors to the expansion of the program of health education.

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A HISTORY OF THE CHRISTIAN ASSOCIATION OF THE UNIVERSITY OF PENNSYLVANIA

(Publication No. 4176)

Mark Chester Ebersole, Ph.D.
Columbia University, 1952

A. Background of the problem

Within recent years the Christian Association of the University of Pennsylvania has been subject to serious criticism. Students, staff and other persons concerned about the Association have many misgivings as to the value and significance of the work now being carried on. As a result of this dissatisfaction, the Christian Association is at the present time re-examining its work and is trying to discover how it can serve more effectively the members of the University community. The inquiry is focused around three major problems: (1) What should be the Christian Association's relationship with the religious units and other units on the Pennsylvania campus? (2) What should be the nature of the Association's program? (3) How can the Christian Association more fully enlist and involve students in its program?

B. Purpose of the Study

This study provides a historical background which is intended to aid the Christian Association in answering the above problems. More specifically, the purpose of the study is as follows:

1. To suggest some of the historical factors and conditions which should be considered in the Christian Association's relationship with the church units and other units on campus. Attention is given to (a) the place of the denominational units and of the Y.W.C.A. in the work of the Association, (b) the nature of the Association's relationship to the Jewish organization, the Newman Club and the University Chaplain, (c) the extent to which the Association was an all-inclusive and/or limited organization.
2. To suggest some of the historical factors and conditions which should be considered in the development of the Christian Association's program emphases and outlook. Attention is given to (a) the various activities and emphases of the Association's program, and (b) the relationship of the program to religious movements within American Protestantism.
3. To suggest some of the historical factors and conditions which should be considered by the Christian Association in order to more fully enlist and involve students in its program. Attention is given to (a) the extent of response of the students to the As-

sociation's program, and (b) the relationship of this response to such factors as (1) the Association's all-inclusive and/or limited character, (2) the significance of the student response to the religious movements, (3) the influence of various personalities — faculty, administration and staff personnel, (4) effect of extra-curricular activities and (5) the significance of denominational consciousness.

C. Chronological period

The study covers a period of ninety-five years, 1856-1951, with the main part of the study devoted to the years 1898-1951. Eighteen ninety-eight marks the time when the present University Christian Association was founded. The historical account of student religious work at the University of Pennsylvania preceding 1898 serves as background for the latter period.

Microfilm copy of complete manuscript of 208 pages, \$2.60. Enlargements 6" x 8", 10¢ per page.

SOCIOLOGY OF TEACHING II: A STUDY OF THE MALE CLASSROOM TEACHER

(Publication No. 4061)

Nathan Amos Edwards, Ph.D.
State University of Iowa, 1952

The purpose of the study was to investigate three areas in the socio-economic life of the male classroom teacher. These were: (1) his and his wife's family of origin, (2) his own situation, and (3) his children. The crucial aspects for the parents of the teachers were their occupations, their educational levels, and their acceptance of community folkways in the level in which they lived. The second part dealt with the living conditions, recreational interests of teachers, vocations of those with whom they spent their leisure time, how they earned their non-contractual income, and other items of demography. The third part dealt with the children. Were they able to adjust as well as or better than children of other groups of parents? As consideration was given to the family of origin, to the male teacher and his wife, and to their children, were there any signs of upward class mobility?

The male classroom teachers in the counties of Linn, Black Hawk, Johnson and Iowa comprised the sample on which this study was made. These counties are located in east central Iowa. Classroom teachers were defined as all men teachers in towns with a population under two thousand, all male teachers except superintendents in cities with populations over two thousand, and those designated as classroom teachers by the superintendents in cities over five thousand.

The study used the interview and questionnaire technique. The men were seen individually for a short period during the school day. Each male teacher cooperating in the study was seen at least once.

The following appear warranted from examination of the findings:

The socio-economic status of teachers' parents compares with that of the lower middle class. Teachers in the fifty and over age group tended to come from a higher level of that class than did those in the under thirty-five age group.

The parents of teachers form a stable group in our society as reflected by their ownership of homes, church attendance and affiliations, and in their frequency of voting.

The relative low income and the frequent changes in school systems contributed to the maintenance of a standard of living that is comparable to the lower middle class.

The birth rate of teachers' families is substantially below that of the families in the general population in Iowa.

Teachers' marriages are substantially more stable than are those in the general population of the state.

Teachers' children are about equally adjusted to those whose fathers are college graduates, slightly better adjusted than those whose fathers have equal incomes and substantially better adjusted than children chosen at random.

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A STUDY OF THE MICHIGAN STATE COLLEGE SUMMER COUNSELING CLINICS

(Publication No. 4025)

Thomas Albert Goodrich, Ph.D.
Michigan State College, 1952

The general purpose of this study was to evaluate the program of the summer Counseling Clinics sponsored by the Counseling Center at Michigan State College. The specific problem was to examine, describe and determine changes evidenced by clients who participated in the clinics during the summer of 1951. An attempt was made to measure changes in the following areas:

1. Self-understanding — knowing one's assets and liabilities.
2. Decision on educational-vocational goals.
3. Orientation information concerning college.

An effort was made to secure objective data evaluating the 1951 clinic from the viewpoint of the participating client.

The method employed in the study was known as the normative-survey method. The particular type of normative-survey technique was the questionnaire inquiry.

A pilot study was made in the summer of 1950. In the summer of 1951, a pre-clinic questionnaire was administered to the entire group of 635 clients during the first session of the respective clinic in which they participated. On the third day, following the final interview, they were given the post-clinic questionnaire. From this group of 635 participants, two hundred people were selected as a random sample by

the random number technique. All information from the completed survey was compiled, tabulated, analyzed and reported in the study.

The results of the research indicated that many people entering college lacked "self-understanding" of their potential capacities to do college work and of their ability to read, as compared to results on the A.C.E. Psychological Examination and the Cooperative English Test C2: Reading Comprehension. Their "self-understanding" increased while they were attending the clinics which enabled them to make more realistic educational and vocational plans. Those with deficiencies that could be overcome were able to enroll in the proper Improvement Services offered by Michigan State College.

There was little evidence that clinic participation led to any radical change in the clients' plans concerning college attendance. Likewise, clients made few changes in ultimate vocational goals while they were at the clinics. The seed for better evaluation of plans may be planted at this time but the actual change appears to be gradual. The most significant change was the trend by a number of clients from special programs toward the No Preference program. This trend must be interpreted in accordance with the Michigan State College Basic College philosophy and organization, and the close relationship of college counselors to the No Preference students.

There was strong evidence that participants gained considerable information about Michigan State College. By engaging in a program of orientation planned for prospective students, they were able to become acquainted with college procedures, which gave them an advantage over the non-clinic participants. This orientation experience was one of the most beneficial results of the entire program, according to the clients.

A preliminary follow-up of clients indicated that they made good academic adjustments to college. They had grade point averages comparable to college juniors at the end of the first term and they had a smaller percentage of people on probation, as contrasted with other entering freshmen. Whether this can be attributed to the clinics alone or to other factors may require further investigation, but the fact that they were superior academically was shown in the research.

Microfilm copy of complete manuscript of 284 pages, \$3.55. Enlargements 6" x 8", 10¢ per page.

FACTORS AFFECTING THE RETENTION OF MEN IN THE TEACHING PROFESSION: A STUDY OF MILWAUKEE STATE TEACHERS COLLEGE MALE GRADUATES FROM 1932-1946

(Publication No. 4037)

Ralph Clarence Graetz, Ed.D.
Michigan State College, 1952

This study is a survey of the men graduates of Milwaukee State Teachers College from the years 1932 through 1946. The purpose of this study was to determine the factors that had influenced the retention of

those men in the teaching profession.

The men graduates were surveyed through the use of a questionnaire. The returns were analyzed statistically by applying the chi square formula whenever this was feasible.

As this study pertained to men graduates of a particular college, it included men of relatively equal or comparable training. Comparisons with the findings of other studies were made. In addition, factors which had not been considered previously were analyzed. Factors such as grade point averages, extra-curricular activities, and the field of preparation (elementary, secondary, etc.) and their effect upon the retention of men in the profession were considered. Also, factors such as graduate work, the influence of military service, the possible influence of a depression or recession, marital status, tenure, and attitude toward teaching at time of college entrance were analyzed.

This study substantiated the fact that men were leaving the profession in large numbers. The four principal reasons for leaving the profession were: low salary, greater interest in other work, limited opportunities, and dissatisfaction with administration. "Idealistic" reasons were predominant among those given for having remained in the profession.

An analysis of the salaries of the men surveyed showed that the men who had remained in teaching were receiving the lowest salaries when compared to the men who had never taught or those who had left teaching. The taking of graduate study and the intent to teach at the time of college entry had strengthened the hold of the profession. Having met a greater number of problems during the first year of teaching was found to be statistically significant but it had not caused men to leave the profession.

The study showed that the group of men who had remained in teaching had received its proportionate share of men with high grade point averages and extensive extra-curricular activities participation. Tenure was found not to have exerted a strong influence on the retention of men in the profession.

The music division was found to have retained the greatest number of men in the profession. The men in this field were not receiving higher basic salaries but had numerous opportunities to supplement these basic salaries.

The profession had lost the greatest number of men in the first four years of teaching. A very small percentage of this group had entered professions closely related to teaching.

It was noteworthy that the group that had remained in teaching had not been particularly interested in administration but one out of four men had become administrators.

In the light of these findings the following steps are suggested: enlarge the scope of guidance activities, establish a longer period of teacher training, foster the "master" teacher concept, encourage democratic school administration, increase the prestige of the profession, and place men on a twelve month salary basis.

Microfilm copy of complete manuscript of 211 pages, \$2.64. Enlargements 6" x 8", 10¢ per page.

A STUDY OF CERTAIN FACTORS IN THE EVOLUTION AND DEVELOPMENT OF THE FLOODWOOD COMMUNITY SCHOOL

(Publication No. 4154)

Lewis Evan Harris, Ed.D.
New York University, 1952

The past decade has witnessed an increasing interest in community schools with educators seeking to learn how such programs may be developed.

The Problem and Its Importance

This study tells how a community-school program was developed in the Floodwood Community School at Floodwood, Minnesota over a twenty-four year period from September, 1925, through June, 1949. Much of the work was of an experimental nature conducted on a trial and error basis as original ideas and projects designed to raise the level of living in the community were tried out by the school with the board, administration, staff, and students working together with the adults in the community. There is need for an empirical study of this kind as well as of other schools engaged in similar activities where the community school is a basic social agency by which a community learns to improve itself and, as such, becomes a laboratory for social learning.

The Historical Background of the Problem

The investigator was a teacher, high school principal, and superintendent at Floodwood during the period studied who saw the school's involvement in community life increase as the narrow college-preparatory curriculum changed to a community-centered educational program based on community needs.

The Procedure Used in Collecting Data and the Types of Data Collected

Historical data were secured from school records, reports, documents, minutes of school board meetings, reports of the superintendent to the board of education, minutes of community organizations, annual financial statements of the cooperatives and the village council, files of the weekly newspaper, articles from farm journals, Duluth, Minneapolis, and St. Paul daily newspaper feature articles, statements of early pioneers, letters and recordings. Eyewitness data were procured through personal interviews with teachers, board members, students, and adult citizens. Correspondence files from the superintendent's office provided additional historical data.

The Results

Factors are identified by presenting natural history data in the form of observed, described and classified facts which indicate how community needs were discerned and met through a wide variety of projects, activities, and other learning experiences involving the school and the community in planning and decision-making.

Guides to the development of community schools elsewhere are drawn from the experiences of this community and its school.

The raw or common-sense observations are presented as possible suggestions for propositions to be tested in future experimental investigation of cause and effect relationships in the development of community schools.

Conclusions

1. The community school is not another community set up as a rival to the community itself, but it is in some ways an idealized projection of the community.

2. The community school may develop and refine various "community-learned" ways of behaving and discourage further development of others.

3. The community school curriculum includes the totality of community-school factors that influence the total behavior pattern of children.

4. The community school curriculum is "improved" as ways of living or behaving in the community are improved — and probably not any faster in the long run.

5. There is need for a more comprehensive definition of the curriculum as a basis for developing theories of behavior.

Microfilm copy of complete manuscript of 471 pages, \$5.89. Enlargements 6" x 8", 10¢ per page.

A STUDY OF THIRD, FOURTH, FIFTH, AND SIXTH GRADE CHILDREN'S PREFERENCES AND PERFORMANCE ON PARTITION AND MEASUREMENT DIVISION PROBLEMS

(Publication No. 4070)

Edwin Henry Hill, Ph.D.
State University of Iowa, 1952

Purpose of Study

The purpose of this study was an attempt to determine third, fourth, fifth, and sixth grade children's preferences for and performance on partition and measurement division problems. The sub-problems were: (a) What sex differences appear, if any, in children's preferences for both types of problems? (b) Are there sex differences in third, fourth, fifth, and sixth grade children's ability to solve partition and measurement type problems.

Scope and Limitations

Tests were administered to 850 children in widely separated school systems. Six tests were discarded which left 844 from which to obtain data. Of the total population, 441 were boys and 403 were girls. There were 400 tests used in School A, 294 from School B, and 150 from School C. The school and grade were used as the units upon which statistical treatment of the data was based.

The following limitations may be factors affecting the results of this study:

1. The number of school systems participating in this study may not be large enough to warrant broad generalizations.

2. The results concerning performance on both types of problems may differ from that reported in this study if the children had been compelled to work all problems.

3. The size of the population at each grade level may have unduly influenced the resulting mean score.

4. Some children's reading ability may have affected performance and preferences.

Procedure

An analysis of 44 arithmetic textbooks for grades three, four, five and six from 11 series was made to determine: (1) the initial presentation of the division process at each grade level, (2) the type of division problem typically found in textbooks written for children in the third, fourth, fifth and sixth grades, and (3) the general difficulty of such problems.

Criteria were established for construction of problems to be used as test items on the basis of the analysis of textbooks and the findings of preference and performance studies. Four twenty-item tests and general directions to teachers for administering the tests were made. Revisions of items and directions to teachers were made on the basis of a preliminary test given to children in grades three, four, five, and six at the University Elementary School, State University of Iowa.

Tests were administered by classroom teachers to children in the following communities: Riverton, Wyoming, Canjoharie, New York, and Grundy Center, Iowa. Tests were scored by the writer and a tabulation of the raw data was made.

The statistical technique used to determine significance of preferences was to test the hypothesis that preferences for partition and measurement problems were equally divided. This was done by establishing regions of rejection and retention for the hypothetical mean at the one per cent confidence interval limits and by observation noting within which region the obtained mean fell. The hypothesis that children solve partition and measurement problems equally well was treated by means of a t-test. An obtained "t" value of 2.776 would be statistically significant at the one per cent level of confidence.

Conclusions

Subject to the limitations imposed, the following conclusions seem warranted:

1. Both boys and girls in the fourth, fifth, and sixth grades in this study indicate preferences for measurement problems.

2. Third grade boys and girls in this study indicate no preferences for either type of problem.

3. The 844 children in this study indicate preferences for measurement problems.

4. Boys in the third, fourth, and fifth grades in this study perform equally well on both types of problems.

5. Boys in the sixth grade in this study perform significantly better on measurement than partition problems.

6. Girls in grades three, four, five, and six in this study perform equally well on partition and measurement problems. The mean accuracy scores favored partition problems in grades three and four compared

with favoring measurement problems in grades five and six.

7. In comparing the performance of total population of boys and total population of girls on partition and measurement problems, the data indicated that both groups perform equally well.

8. No sex differences appear in preferences for partition or measurement problems.

Microfilm copy of complete manuscript of 173 pages, \$2.16. Enlargements 6" x 8", 10¢ per page.

A COMPARATIVE STUDY OF A SELF-SURVEY AND AN EXPERT SURVEY OF AN ELEMENTARY SCHOOL CURRICULUM

(Publication No. 4000)

Kenneth Lawrence Husbands, Ed.D.
University of Illinois, 1952

Purpose

It was the purpose of this study to analyze and compare the findings and recommendations resulting from an elementary school curriculum survey made by a staff of educational experts with the findings and recommendations resulting from a survey by the local teaching staff of the same elementary schools.

Procedure

In order to make the analysis and comparison, the curriculum of a school system consisting of three elementary schools enrolling children from kindergarten through grade six was first surveyed by employing a staff of educational experts, and later by the local teaching staff using self-survey techniques.

The staff of educational experts consisted of eight members of the permanent staff of the college of education of a large state university. The local instructional staff was made up of the entire elementary school teaching staff and special teachers in the school system in which the surveys were made. The two surveys, although carried on in the same school system, were divorced as completely as possible from one another; that is, the expert staff had no part in the self-survey and the expert survey was completed before the self-survey was begun.

The data compared consisted of the individual reports of the experts who had been assigned particular curricular areas to examine and a single report from the local teaching staff resulting from an analysis of their responses to a questionnaire developed by themselves. A list of curricular areas usually examined in school surveys was developed by examining and analyzing ten recent school surveys. This list of factors served as a framework within which to classify, examine, and compare the findings of the experts and the teachers.

Each curricular area which was examined and reported by both the experts and the teachers was analyzed and compared by the investigator. Curricular areas not examined by both survey groups were reported by the investigator and served to point out

curricular areas which were given attention by one group and ignored by the other.

Summary

Although using different survey techniques, both survey groups selected similar curricular areas for study. In general, the findings of the experts and the teachers were in agreement when describing aspects of the curriculum dealing with what was taught and the adequacy and availability of materials and facilities employed in the instructional program. On the other hand, there were marked differences in the findings of the two groups relative to teaching methods and the type of classroom organization and management employed in the instructional program. Sharp contrasts between the findings of the experts and the teachers were observed in the following areas: (1) instructional methods in art and music, (2) organization and presentation of curriculum content, and (3) community relationships.

Throughout their reports the experts were concerned with evaluating curricular practices in terms of a set of educational principles. The report of the teachers showed little concern for a normative evaluation of the educational program.

Numerous references were made by the experts to the differences in the level of the educational program from school to school. These differences were neither observed nor reported by the teachers.

Recommendations by the experts were focused on ways and means of bringing observed curricular practices and procedures in tune with modern principles of educational philosophy and psychology. Recommendations of the teachers were, in the main, appeals for more adequate materials and classroom facilities.

The experts, as a group, consistently agreed on their description of and opinions about the educational program. There were many disagreements and inconsistencies in the report of the teachers as to what the curricular practices and procedures actually were or should be.

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AN ANALYSIS OF CERTAIN ASPECTS OF A LISTENING TRAINING PROGRAM CONDUCTED AMONG COLLEGE FRESHMEN AT MICHIGAN STATE COLLEGE

(Publication No. 4039)

Charles Edward Irvin, Ed.D.
Michigan State College, 1952

This study was conducted to test the efficacy of teaching listening by direct instruction. Among the many problems that evolved, three became most important: 1) the actual selection and arrangement of teachable materials; 2) the integration of seven units of listening instruction with the college course of Written and Spoken English which is required of all

freshmen at Michigan State College; 3) the evaluation of instructional results.

Materials were selected and arranged by a committee of four members of the Written and Spoken English Department staff. Seven units of listening instruction of ten minutes each were then integrated with the one-hour lecture sections of the course in the Fall Quarter, 1951. These lecture sections were eight in number and each contained between 200 and 300 students.

To facilitate evaluation of results, the design of the study was kept simple. Four lecture sections, two meeting in the morning and two in the afternoon, were designated as the experimental group which received the seven units of listening instruction. These seven units were taught, one per week, over a period of seven weeks. The other four lecture sections, also evenly distributed between morning and afternoon periods, were designated as the control group and received only the regular work of the course. Both groups were tested twice: once prior to the initiation of the training program; once immediately after the completion of the program. The study was tightly controlled in order to eliminate or minimize the many variables operative in the listening activity.

The listening tests employed were those constructed by Ralph Nichols at the University of Minnesota. Four 12-question tests, designed to measure listening comprehension, were used; two were given as the pretest and two were given as the post-test. Each of the tests covered a different subject-matter area. The materials over which the tests were given consisted of short recorded lecture segments in the subject area corresponding to each test.

It was hoped that the testing would reveal three things: 1) whether or not a difference would exist between groups after one group had received listening instruction; 2) whether or not a difference in listening skill existed between the sexes; 3) whether or not a difference in listening skill existed according to the time of day that students listened.

Two major statistical procedures were utilized to evaluate the instructional results. An analysis of variance was used to weigh the differences which might exist because of sex and time of day. An analysis of covariance was used to weigh and adjust the differences that might exist between groups due to pre-existing differences in listening aptitude. Many of the variables operative to produce such pre-existing differences were thus minimized in effect. In addition, the extreme low and extreme high scoring brackets were examined for an analysis of instructional result.

While the experimental and control groups each contained approximately 1200 students, a random sampling of 500 for each group was used as the test population for the evaluation of results.

As an outgrowth of this study, the following conclusions appear to be justified: 1) a sufficient number of the processes involved in listening can be positively influenced by teaching as to result in improvement in listening as measured by behavior on the tests used in this study; 2) with reason, the listening training given could be credited for creating

a highly significant difference between the experimental and the control groups; 3) with reason, the listening training given could be credited for resulting in a very appreciable gain among the below-average listeners, as measured by pretest behavior; 4) the listening training given was apparently ineffective among the above-average listeners, as defined by pretest behavior; 5) male students appeared to be significantly superior to female students in performance on the listening tests used in this study; 6) time of day appears to have had no significant influence upon listening ability as measured by the tests used in this study.

Microfilm copy of complete manuscript of 179 pages, \$2.24. Enlargements 6" x 8", 10¢ per page.

AN EVALUATION OF THE EFFECT OF PRACTICE EXERCISES IN VISUAL DISCRIMINATION IN FIRST GRADE

(Publication No.4075)

Marion Jeanne Jennings, Ph.D.
State University of Iowa, 1952

In the experiment reported visual discrimination practices composed of letters and words were presented in first grade in order to evaluate the effect of this training on reading ability.

Five hundred ten pupils in twenty-two classrooms in the public schools of Ottumwa, Iowa, took part. Assignment of classrooms to the experimental and control groups was made on the basis of the results of readiness tests given in the kindergarten year.

Twenty-nine practice lessons, paired with the same number of daily check tests of approximately equal difficulty, were constructed by the writer. To accompany these, daily lessons were also prepared, giving explicit directions for the use of both the practice lessons and tests. This training was carried on for twenty-nine consecutive days, from September 19 to October 29, 1951.

To measure the effect of these practices, five criterion tests were administered over a period of eight months, October to May. Two of these, the Visual Discrimination Test and the Word Recognition Test, were constructed by the writer. The other three, Metropolitan Achievement (two forms), and the Word Identification Test, were selected by the writer.

The data from these criterion measures were analyzed to determine the effect of the special practice lessons and tests provided for the experimental group. Differences in three levels of ability were also analyzed. These levels, designated as High, Middle, and Low, were classified on the basis of reading readiness test scores.

The data appear to justify the following conclusions, subject to the conditions of the investigation.

1. Differences in favor of the method are positive and in some cases significant.
2. Systematic daily instruction results in the improvement of skill in making visual discriminations using letters and words. A statistically significant

mean difference in favor of the experimental group was obtained.

3. A significant difference in favor of the experimental group was found for a vocabulary test involving word meaning which was administered in May. A sizeable difference for this same test in January failed to reach significance. Possibly this trend in January and significant difference in May can be attributed to increased emphasis on work analysis as compared with the emphasis on acquiring a sight vocabulary during the first semester.

4. In the analysis of results according to ability level, High, Middle and Low, differences favor the experimental group, particularly at the high ability level. Significant differences for this group were found for a word meaning test and a word recognition test.

5. Pupils in all three ability groups profited significantly from systematic instruction in visual discrimination, the largest absolute gain being made by the Low Group:

	Diff.	C.R.
High	8.89	6.396
Middle	8.22	6.738
Low	12.95	7.754

The following implications for first grade instruction in reading are reported:

1. Since the differences in favor of the method are positive, and the cost involved is nominal, it is recommended as a type of instruction in beginning reading.

2. Children classified in the low groups of first grade do not have to have visual discrimination practice lessons limited to pictures and objects. The evidence shows that they can profit from training with letters and words.

3. Pupils who have high scores on visual discrimination in reading readiness tests should not be eliminated from this type of training. They can still profit by practice, especially since skill in visual discrimination, for the upper group particularly, appears to have a positive effect on two aspects of vocabulary development, word meaning and word recognition.

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THE DEVELOPMENT OF HUMAN ANATOMICAL INSTRUCTION IN AN INTEGRATED PROGRAM OF MEDICAL EDUCATION

(Publication No. 4142)

Benjamin B. Kamrin, Ph.D.
New York University, 1952

The most efficient and effective method of teaching the human anatomical sciences in medical schools of the United States has been subject to much controversy. The methodology now being used in American Medical schools varies from completely

compartmentalized morphological presentation to total correlated and integrated teaching. Proponents of the conventional procedures point to a history of over one hundred and seventy-five years of such practice and bask in the security of precedent. Anatomists who seek to change the *status quo* are those with neurological training and/or clinical training. The latter point to student reaction against the acquisition of seemingly unimportant anatomical details and minutiae, the mature opinion of medical graduates who feel that the present anatomical methodologies leave much to be desired, and the demands of the clinical teachers who claim that the students present themselves with an inadequate background of knowledge in the preclinical sciences. It is the thesis of this investigator that correlation and integration of the anatomical sciences into the entire medical curriculum is the most efficient and effective methodology which can be employed in this dynamic educational field.

This study traces the position of the anatomical subjects in twelve selected medical schools in the United States from the founding of the schools to the present. These schools have the following in common: They employ a conventional program of anatomical teaching. They all have passed through the transitional period of the Flexner Report. In other respects, these schools are widely diversified in geographical location, endowment or support, character of faculty, physical and clinical facilities. Through interview, questionnaire and personal inspection, this study analyzes (1) objectives of each particular school's anatomical department; (2) the methods used to implement the stated objectives; (3) the criteria used to indicate the success of the program; and (4) the direction in which the department heads feel the future teaching of anatomical sciences is moving. This study finds that a majority of the conventional teachers of anatomy in the selected medical schools believe in the desirability of correlation of the anatomical subjects and the apparent inevitability of the integration of the entire medical curriculum.

In this study, the conventional programs of the selected medical schools are compared with three correlated anatomical programs, and one totally correlated and integrated program of medical education recently instituted.

This study argues that under the correlated and integrated medical curriculum (and anatomical subjects) the medical student can best acquire the kind of medical skills and understandings that are built upon a broad knowledge of the growth, development, differentiation, maturation and eventual decay of the normal human being. Through such learning the student acquires not only a knowledge of morphological details but insight into function as well. This is the basic purpose of anatomical knowledge — the understanding of the details of structure as they relate to function in the living human being. Through the correlated-integrated approach, structure is studied not *per se* — but in its functional relations to the preclinical areas. Thus the normal living being is understood as an entity. Similarly the deviations from normal structure and function must be integrated with the subject material contained in the sciences of microbiology, pathology and

psychiatry. After the student has acquired preclinical foundational knowledge, he is prepared to integrate this information into the clinical sciences.

This study further notes the critical role of the medical faculty in the development, launching and practical implementation of the correlated-integrated medical curriculum. Revision of the medical curriculum requires more than realignment and shifting emphasis in content and method. It depends upon the degree to which the faculties in the preclinical fields can be aroused to direct their energies to achieving unity of aim and purpose so essential to effective teaching and learning.

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A COMPARISON OF MENTAL ABILITIES OF BRIGHT AND DULL CHILDREN HAVING THE SAME MENTAL AGES

(Publication No. 4078)

Oliver Paul Kolstoe, Ph.D.
State University of Iowa, 1952

The purpose of the present study was the investigation of the nature of systematic, intellectual differences between two groups of children of approximately equal mental age, but different chronological ages and IQ's. A "groups by levels" design was employed in the analysis of results. The groups consisted of twenty-nine third and fourth grade children, with estimated true Stanford-Binet IQ's of 116 or above, and twenty-nine eighth and ninth grade pupils with estimated true IQ's of 84 or below. Four, six-months intervals of estimated true mental ages, ranging from 10 years, 7 months, to 12 years, 6 months, constituted the levels.

The estimated true IQ and mental age scores were obtained by regressing the obtained scores on the Revised Stanford-Binet Scale, 1937, Form L. These criterion tests consisted of all of the subjects except Mazes from the Wechsler Intelligence Scale for Children, the Benton Test of Visual Retention, an original Symbol Copying Test, scored for both speed and accuracy of copying, and the subtests of the Chicago Tests of Primary Mental Abilities.

In most cases, the differences between the means of the groups were small and not statistically significant. The dull group was superior to the bright on the WISC subtests, Comprehension and Coding, on the speed scores for the Symbol Copying test, and on the PMA subtest, Number. The bright group was superior to the dull on the WISC subtest, Digits, and on the accuracy score for the Symbol Copying test.

The results of the present study support the generality of the mental age concept. No evidence was found to support the claims of some writers that the bright are superior in such mental tasks as vocabulary, reasoning, and a general memory ability. Nor does the evidence from the study indicate a superiority in general performance or manual manipulation

for the dull.

It therefore seems reasonable to conclude that a dull child with a mental age of seven, for example, should be expected to perform about the same kind of mental tasks as any normal or bright child with a mental age of seven, and so on for other mental age levels, if we may generalize from the data for the levels 10 to 12 to other levels. Certainly this investigation has failed to reveal anything very wrong with the Stanford-Binet mental age at the 10 to 12 year levels, so far as bright and dull children are concerned.

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A STATISTICAL ANALYSIS OF FACTORS INFLUENCING INDIVIDUAL SALARIES IN THREE INSTITUTIONS OF HIGHER LEARNING

(Publication No. 4205)

Frank S. Kristof, Ph.D.
Columbia University, 1952

This is a statistical study which attempts to isolate some factors influencing academic salaries of individual faculty members of three large midwestern, land-grant institutions. The 1948-49 salaries of 1,315 individuals were studied; they represented faculty members of the four ranks from instructor to full professor from the Liberal Arts, Engineering, Agriculture, Commerce and Law faculties of these three institutions. The factors chosen for study were rank, age, type and extent of experience, publication, possession of the Ph.D. degree, and teaching field. The data were gathered in a field study, were transcribed to IBM cards, and the basic tabulations were accomplished on IBM machines.

The total salary variation among individuals was divided into two basic components: (a) variation in salary among the four ranks — this accounted for 76.7 per cent of the total — and (b) variation in salaries within ranks — this accounted for the remaining 23.3 per cent of the total. The variation of individual salaries within each of these components was analyzed. Although age, experience, publication, possession of the Ph.D. degree and teaching field each were found to make a small contribution to within-rank salary variation, on the whole they did not account for any significant percentage of the total variation of this component. Evidently, factors not within the scope of this study were more important than the variables studied.

The reverse was found to be true for salary variation among the four ranks. The variables studied were found to account for significant percentages of total salary variation in this area. This means that most of the effect of the variables upon salary works through promotion in rank. For instance, the correlation of age with salary was +.60, that for years of experience and salary was +.61, and that for publication and salary was +.57.

Publication and the Ph.D. degree were found to be important elements in the careers of the individuals in this sample. Relatively few people reached the rank of full professor without publication and, except for a small percentage of presumably very able people, the lack of the doctorate was found to hinder advancement in rank and salary. Differences in opportunities in various teaching fields also appeared to contribute somewhat to variation in individual salaries.

The cross-section of the 1948-49 salaries of the 1,315 people in this sample was used to build up estimates of their life earnings; the substantial effect of publication and the Ph.D. degree upon these estimates also was computed. Finally, the regression equation for the combined effect of age, publication, and possession or the lack of the Ph.D. degree was computed. The three variables accounted for 56.3 per cent of the total salary variation among individuals, a significant finding for just three among the very large number of factors considered to influence salaries of individual faculty members in this type of institution.

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A STUDY IN MEASURING SELECTED MOTOR SKILLS AT THE FOURTH, FIFTH, AND SIXTH GRADE LEVELS

(Publication No. 4080)

Marjorie Elizabeth Latchaw, Ph.D.
State University of Iowa, 1952

This study was primarily concerned with measuring outcomes in selected skill areas for the purpose of improving teaching in physical education at the fourth, fifth, and sixth grade levels. Cursory examination of these areas had indicated that the fundamental skills of running, jumping, throwing and catching, striking, and kicking are basic to performance in many activities in these grades. It was the purpose of this study to (1) develop satisfactory measures of achievement in the selected motor skills for boys and girls in grades four, five, and six, (2) establish norms or standards of performance in these skills for the population measured, (3) determine the relationship, if any, of such factors as age, height, and weight to performance as measured by the given tests.

A number of established tests that measure performance in skills at the high school and college levels were investigated, and revisions and modifications were made until they appeared to be suitable for the fourth, fifth, and sixth grade levels. Seven tests were selected from this group, two throwing tests, two jumping tests, a kicking test, a striking test, and a running test. These tests were administered to the fourth, fifth, and sixth grade boys and girls from schools in Iowa and Illinois, who were the subjects for this study.

An analysis of the data appeared to indicate the following conclusions:

1. The reliability coefficients appeared to be high enough for each test, by grade, and by sex, to justify their use in measuring performance at the fourth, fifth, and sixth grade levels.

2. The relationship between age, height, and weight and performance as measured by these tests appeared to be relatively low for the subjects used in this study. Height and weight factors, in general, showed lower relationship to performance than did the age factor for both boys and girls.

3. The mean scores were, in general, significantly higher from grade to grade for each sex and for each test.

4. In general, the difference between the means of performance for age groups within each grade was not significant for boys. The difference between performance of age groups for boys from grade to grade was significant at the one per cent level of confidence for all tests. This appeared to substantiate the hypothesis that experience is a more significant factor in determining performance in these tests for the subjects measured, than is age.

5. In the tests with the highest and lowest relationship between age and performance for girls, the difference among age groups within grades was not significant at the one per cent level of confidence. The composite of age groups for all three grades was significant at the one per cent level for one test and was not significant for the other.

6. The mean scores for boys in each grade and for each test were higher than the mean scores for girls in the same grade.

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AN EVALUATION OF ELEMENTARY SCHOOL PUPILS' KNOWLEDGE OF CANADA AS RELATED TO THE OPINION OF AUTHORITIES

(Publication No. 4081)

Richard Thomas Lattin, Ph.D.
State University of Iowa, 1952

The purpose of this study was to discover what elementary school children know about Canada and relate this knowledge to what certain authorities consider to be the important factors that students should be given an opportunity of learning.

A test was prepared and administered to 752 sixth grade students in nineteen east-central Iowa school systems with various sized pupil enrollments. Twelve geographers and one historian, an authority on Canada, judged the test items, considering whether they covered concepts and generalizations that students should be given an opportunity of learning.

A questionnaire, designed to give insight into the emphasis given Canada by the various schools, was completed by each of the schools tested.

Subject to the conditions of the study, the analyzed

data appear to warrant the drawing of several general conclusions. The large standard deviation for the total group indicates that there was a wide variation in the amount of information known by the various individual students tested. The mean score for the total group shows that students knew approximately one-third of the items tested. In general, there was wide variation in the opinions of the experts as to the importance of students being given an opportunity to learn the information requested in the items. However, all but approximately 7 per cent of the items in the test were classified as either "extremely important" or "important" by a majority of the authorities. Most schools present a unit on Canada which is usually offered at the fifth grade level. There is some indication that an instruction period of two weeks is most commonly allotted for the teaching of a unit on Canada. There is also some slight evidence that a greater length of instruction time produces better results on a test covering Canada.

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PREDICTION OF ACADEMIC ACHIEVEMENT AND INTELLIGENCE FROM COMMUNITY AND SCHOOL-SYSTEM CHARACTERISTICS

(Publication No. 4209)

Roger Thomas Lennon, Ph.D.
Columbia University, 1952

The purpose of this study was to investigate the extent to which the measured achievement and intelligence of the public elementary school population of a community may be predicted from a knowledge of certain social and economic characteristics of the community, and certain characteristics of its school system.

For each of a group of 39 communities, average scores on five selected tests of the Stanford Achievement battery (paragraph reading, spelling, arithmetic computation, arithmetic reasoning, and social studies) and average IQ's of all pupils in grades 3, 5, and 7 of the communities' school systems, were obtained, together with data on seven socio-economic measures and on four characteristics of the school system. The socio-economic measures included size of population, per cent of population native-born white, median schooling of the adult population, per cent of adult illiteracy, median monthly rental, per cent of home ownership, and per cent unemployment; the school system measures included per pupil current expenditure, average teacher salary, number of days in the school year, and the average class size. Data on these community and school-system characteristics were obtained from census reports and from official school reports.

Intercorrelations among all variables were computed and significant relationships identified. Multiple correlations were computed between criterion variables and various combinations of predictor

variables in order to ascertain the maximum predictability of the criteria; and partial correlation techniques were employed in an effort to assay the relative importance of the contributions of the several predictor variables to the relationships discovered.

The major findings of the study may be summarized as follows:

a. Significant relationships were found between certain achievement measures and certain characteristics of the community and of the school system. Median schooling of the adult population, median monthly rental, per cent of adult illiteracy, per cent native white, and per pupil current expenditure most consistently yielded the highest correlations with achievement in the several subjects. The several subjects varied with respect to their predictability, with respect to the predictor variables with which they were most strongly associated, and with respect to the direction of their relationships with some predictors.

b. Correlations between achievement and any single predictor tended to be small, but multiple correlations of the order of .4 to .5 between achievement in the several subjects and best sets of predictors were obtained.

c. Significant relationships were found between average IQ and several measurable characteristics of the community, particularly median schooling of the adult population, per cent of adult illiteracy, and median monthly rental. These three predictors had a median correlation with mean pupil IQ of about .6; the best combination of them yielded a multiple correlation with mean IQ of about .65.

d. No evidence was found for any change in these relationships from grade to grade.

The findings were judged to have importance from the standpoint of improved understanding of the impact of community forces on quality of schooling, and to have practical significance for the constructor and user of achievement and intelligence tests by making possible (1) more effective selection of communities for norm groups and (2) more accurate application of norms to any particular community.

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THE DEVELOPMENT OF HIGHER EDUCATION IN THE CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS

(Publication No. 4030)

Don Wallace McBride, Ph.D.
Michigan State College, 1952

The purpose of this study is twofold: (1) to trace the development of higher education in the Church of Jesus Christ of Latter-day Saints, and (2) to compare educational practice in the Church with the philosophy and doctrines propounded by its leaders. Along with this has been a comparison of Church educational philosophy with the relatively progressive school of thought and action in education, experimentalism.

Also included in this thesis is a survey of the literature pertaining to the evaluation of education among the Mormons or members of the Church of Jesus Christ of Latter-day Saints.

Histories, catalogues, and registrar files were consulted. Newspaper articles, journals, and oral communications were valuable sources of information. The Church historian's library in Salt Lake City, the libraries of the University of Utah and the Brigham Young University and the files of the Church department of education were found to be most helpful.

The leaders of the Church of Jesus Christ of Latter-day Saints established the University of the City of Nauvoo, Illinois in the year 1840 and the University of Deseret (later the University of Utah) in Salt Lake City in 1850. Political and economic problems retarded the growth of public education in Utah at all levels, but private and parochial education advanced steadily until the last decade of the nineteenth century when church and state were more thoroughly separated and Utah became one of the United States of America. In 1890 the elementary schools were made free and public and in 1911 the public secondary schools were made accessible to all.

As the state assumed more and more responsibility for secular education, the Church gradually diminished her efforts in that field and even relinquished her physical plants to the public. Since the week-day religious education needs were not being met by the public schools, the Church established seminaries adjacent to public secondary schools and institutes adjacent to public colleges for this purpose.

Of the original thirty or more academies begun by the Church in the latter part of the nineteenth century, only four remain today as Church schools. Most of the effort and finances dispensed for education in the Church today is for the support of higher education, for it is in this area that the public is making the smallest contribution.

In comparing the Mormon philosophy with experimentalism it was concluded that they have much in common. Both believe that the worth and dignity of the individual, and the ability of the group to govern itself through enlightened and critical judgement are basic elements in an educational program in a democracy. Both accept experience and the scientific method as means of arriving at truth and goodness. Both set up as goals the process of growth and creativity. The principal difference is that the Mormon viewpoint considers God to be essential in man's search for the truths of life, while the experimentalists hold that for all practical purposes there lies within a realm of human experience alone the necessary means for arriving at these truths.

Microfilm copy of complete manuscript of 524 pages, \$6.55. Enlargements 6" x 8", 10¢ per page.

THE RELATION OF FACTORS IN THE ORGANIZATIONAL PATTERN OF SCHOOL SYSTEMS AND ADAPTABILITY

(Publication No. 4213)

George Bruce McClellan, Ph.D.
Columbia University, 1952

"No one has ever attempted to show the general relationship between fiscal independence and school efficiency. One of the reasons why this has never been done is that there has been no adequate method of comparing one school system with another and, thus, drawing conclusions based on fact."¹ These words of Frasier's, written in 1922, were as true for the entire organizational pattern of a school as for the single factor of fiscal independence. Again in 1949, McLaughlin² deplores this lack for no study has been made to meet this need.

Purpose of the Study:

From various studies during the last fifteen years, pioneered by Mort and Cornell,³ we now know that one measure of a school's efficiency is its adaptability. It is the purpose of this study to inquire into the relationship between the organizational pattern of a school and adaptability.

Specifically, this study has three objectives: To explore the relationship of organizational factors pertaining to the superintendency, the fiscal status, and boards of education to adaptability; to find if changes could be suggested which, assuming cause and effect relationship, would result in a school structure conducive to growth in adaptability; and to discover specific structural characteristics which are related to adaptability growth. To do this, data from the schools in the Metropolitan School Study Council are used.

Procedure of the Study

This study introduces a new concept in the measurement of adaptability — adaptability growth. To measure it, advantage was taken of the existence of two instruments that, even if applied currently, give the adaptability status of a school system at different times. The instrument, "The Growing Edge,"⁴ measures current adaptability, or the ability to change to present day practices. The instrument, "The Time Scale,"⁵ reflects the adaptability status as of the 1920's. The difference between these two scores is taken as an index of growth in adaptability.

The relationships between the defined index of growth and the organizational pattern of factors concerning the superintendency, the fiscal status, and the board of education were measured statistically and by observations of school systems themselves. Organizational factors were studied separately and in composite form. Other factors known to be related to adaptability were held constant at the terminal point of the data to eliminate their influence upon the discovered relationships.

Results of the Study

The study discloses that there is a highly

significant relationship between the index of growth in adaptability and the composite of factors pertaining to the board of education. Taken individually, the factors of fiscal independence and the method of selecting members of boards of education are closely related to adaptability growth as measured. It was found that factors concerning the board of education predicted 50% of the index of growth used. No significant relationship was discovered between the index of growth and the factors pertaining to the superintendency, studied either separately or as a composite.

The study includes an independent evaluation of the adaptability growth of school systems by the Superintendents. The results of this subjective study are in line with those of the statistical analysis.

This study shows a challenging relationship between certain organizational factors of a school system and, using adaptability growth as a measure, the quality of its education. Also, it adds the concept of adaptability growth to the tools for evaluating school administration.

¹George W. Frasier, "Control of City School Finances." Milwaukee, Wisconsin: Bruce Publishing Company, 1922. 132 p.

²Frederick C. McLaughlin, "Fiscal and Administrative Control of City School Systems." New York, N.Y.: For the Joint Committee Representing the New York State Educational Conference Board and the Public Education Association in New York State, Pamphlet #4, 1949.

³Paul R. Mort and Francis G. Cornell, "American Schools in Transition." New York, N.Y.: Bureau of Publications, Teachers College, Columbia University 1941. 546 p.

⁴Paul R. Mort, William S. Vincent, and Clarence A. Newell; "The Growing Edge; An Instrument for Measuring the Adaptability of School Systems." New York, N.Y.: Metropolitan School Study Council, Teachers College, Columbia University, 1946. 44 p.

⁵Paul R. Mort and Truman M. Pierce, "A Time Scale for Measuring the Adaptability of School Systems." New York, N.Y.: The Metropolitan School Study Council, Teachers College, Columbia University, 1947, 12 p.

Microfilm copy of complete manuscript of 83 pages, \$1.04. Enlargements 6" x 8", 10¢ per page.

CERTAIN SOCIAL MOVEMENTS AS REFLECTED IN UNITED STATES HISTORY TEXTBOOKS

(Publication No. 3622)

Helen Nichols Merritt, Ph.D.
New York University, 1952

The problem of this dissertation is to determine to what extent seven social movements, namely, women's rights, labor, temperance, free public school, secularization of education, care of the socially dependent, and the rise of new religious sects,

are reflected in secondary school United States history textbooks published during 1840-1870, 1890-1910, and 1930-1940.

The problem relates to such questions as, what constitutes an adequate history textbook, how can history books be written so that children shall not become biased or influenced through disproportionate emphasis of material; how aware historians have been of social factors in the writing of history textbooks, how great has been the lag between the occurrence of a movement and its appearance in history textbooks; and, lastly, how this lag may have retarded the solution of political, economic or social problems.

Sixty-eight books were examined to determine the amount of space devoted to each movement, its first appearance, frequency of appearance, and treatment. The treatment was analyzed to ascertain whether the movement was merely mentioned, mentioned in outline form, developed somewhat from the outline, or developed fully to include a description of the movement, the factors leading up to the movement, its implications, and results.

Following a short history of each movement, samples of the treatment of the movements are given and interpreted in the light of the times in which the texts were published, of influences brought to bear upon the writers of the books, and of the characteristics inherent in the movements. Comparisons are made of the treatments of each movement by the several writers as well as the treatments of the several movements by each writer.

The study discloses that there is no consistent pattern of dealing with social movements in the textbooks; that there is no inherent cause which would explain the treatment of the movements — any common cause must be found in the contemporary setting; that the lag in treatment of the movements in the first two periods in the textbooks was not greater than the lag in the treatments of the movements in the same period in current periodicals; that the development of an institution out of a movement or its national recognition determined its incorporation in textbooks; that a movement must be a dynamic force in the life of the people, must be seen in retrospect, or evince a stream of causality and development before it is acclaimed in textbooks; that the establishment of national educational committees was slow in bringing social movements into textbooks.

Conclusions and recommendations indicate that the lag between movements and their inclusion in textbooks should be eliminated so that youth may identify himself with current social, economic and political processes; since a choice of facts constitutes groundwork for bias and predisposition, let there be positive agreement on desirable goals and point textbooks toward those ends; that the role of a teacher fluctuates with the quality of a textbook; slowly changing textbooks lose out in the race with periodicals in mirroring social movements; wide differences in textbooks preclude any complacency as to their efficacy in the teaching process; since present methods of writing textbooks present a barrier to adequate textbooks, the task might well be relegated to a national committee of history teachers; that the history textbooks

of the future be skeletal in form with broad areas presented developmentally. These can be expanded and enriched by narrative and descriptive source material, which will have real meaning for pupils; that the enduring textbooks are those which include social movements.

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EFFECTS OF TRAINING UPON THE CARDIAC OUTPUT AT GROUND LEVEL AND AT 15,000 FEET SIMULATED ALTITUDE

(Publication No. 4004)

Ernest Denzil Michael, Jr., Ph.D.
University of Illinois, 1952

The Problem

To test the hypothesis that endurance running would increase the quiet sitting cardiac output and this would be reflected in the reaction of the body to the stress of 15,000 feet simulated altitude.

Method of Investigation

The Grollman acetylene method was used in this study to measure the cardiac output of three subjects who were graduate students in physical education at the University of Illinois.

All the testing was done in the post-absorptive state in the quiet sitting position. The subjects were tested at ground level and at 15,000 feet altitude simulated in a decompression chamber. Each subject was tested twice at ground level and twice at altitude before training, every fourth week during an endurance running program, and every fourth week during an eight-week de-training period.

The endurance running program was followed five days per week and consisted of 220-yard runs, 440-yard runs, 880-yard runs, and two mile runs spaced throughout the week. The number of runs was increased each week during twelve weeks of training.

Results

Using the "t" test of significance and graphs of month to month changes, the following conclusions were reached:

1. At ground level significant increases were made in the average quiet sitting stroke volumes and O_2 intakes during twelve weeks of endurance running.
2. At ground level the average pulse rate and the RQ decreased significantly after twelve weeks of endurance running.
3. The $A-VO_2$ difference and minute volume increased during training but not as significantly as the other measurements.
4. At altitude during training, the measurements changed in the same direction as at ground level, but were not as great.
5. After twelve weeks of training, the average minute volume and O_2 intake did not increase when going to altitude as before training, and the average

pulse rate rose only 11 beats per minute when the subjects were taken to altitude as compared to 17 beats per minute before training.

6. After twelve weeks of training, the average RQ had dropped from .90 to .80 and the average pulse rate from 80 to 69 beats per minute when the subjects were at altitude. These figures correspond to the averages found at ground level before training.

7. During de-training, the minute volume was the only measurement that continued changing in the same direction as during training. The other measurements all leveled off and began to reverse.

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INTEREST FACTORS PREDICTIVE OF TEACHERS' RAPPORT WITH PUPILS

(Publication No. 4131)

Harold Eugene Mitzel, Ph.D.
University of Minnesota, 1952

It has been postulated that the personality of the teacher is an important factor in determining the degree to which the objectives of the school are achieved. This concept of the teacher's personality includes interests, attitudes, and characteristic ways of behaving. Recent attempts to discover attitudinal factors related to a teacher's ability to "get along" with pupils (one of several important elements of effective teaching) have been fruitful; consequently, the notion was advanced in this study that there were also interest factors characteristic of teachers who did and teachers who did not have rapport with pupils.

This investigation was limited to women teachers in graded elementary public schools of the State of Minnesota. Agreement to cooperate was obtained from 195 school superintendents, each of whom designated the woman elementary teacher on his staff who had the best relationship with her pupils and conversely the teacher who had the least rapport with pupils. In schools employing twelve or more elementary teachers, designations were asked for two teachers from each extreme. Copies of the Strong Vocational Interest Blank and the Minnesota Teacher Attitude Inventory were handed to the designated teachers by the superintendent for return directly to the author. A total of 457 teachers or 89 per cent of those designated returned complete tests.

By combining into groups teachers who had been designated at each extreme an initial criterion of supervisors' judgments regarding teachers' ability to achieve rapport with pupils was defined. The MTAI was used as an instrument to "purify" the initial criterion in the following way: Inferior teachers were defined as those who were designated as poorest by administrators and who obtained MTAI scores below the normative mean for elementary teachers; Superior teachers were defined as those who were designated as best by administrators and who obtained scores above the MTAI normative mean. Application

of the two criteria resulted in the formation of two groups — 138 inferior teachers and 115 superior teachers.

Individual item responses of these extreme groups on the Strong were analyzed by the chi-square technique to isolate those interest items which differentiated between inferior and superior teachers. Because a significant age difference was found between the two groups, i.e., the median for inferior teachers was 27 years, the median for superior teachers was 37 years, it was found necessary to study the age component of each item and to eliminate items reflecting gross age differences in response. Within each of the two groups of teachers designated by superintendents, age thirty provided a convenient division point with which to test for response differences between older and younger women teachers. A total of 95 Strong items, called Index R and scored with differential weights of +1, 0, -1, was finally selected. These items all discriminated between inferior and superior teachers at the .10 level of significance and no items were included which appeared to have large components related to the age of the teacher.

Strongs for separate validation groups of 57 inferior and 76 superior elementary teachers were scored on Index R. A between-groups difference in mean scores of approximately 1.5 standard deviations was found to be significant at the .001 probability level. In addition to its demonstrated validity, Index R for the 133 teachers in the two validation groups was found to have an internal consistency reliability of .989 (Hoyt Method).

The 95 discriminating items which make up Index R were organized into eight categories to provide a description in terms of interests of the differences between superior and inferior women elementary teachers. Superior teachers in greater proportions than inferior teachers (1) express preferences for esthetic and cultural activities, especially professional writing; (2) indicate tolerance for human frailties; (3) like occupations and activities concerned with the solution of people's personal problems, e.g., social worker, minister, psychiatrist; (4) show preference for activities which enable them to meet people and exercise leadership. On the other hand, inferior teachers in greater proportion than superior teachers (1) prefer routine sub-professional occupations, e.g., typist, waitress, telephone operator, etc.; (2) show reluctance to accept responsibility in the school situation.

The significance of this study is suggested by the following conclusions: (1) inventoried interests can provide important information about the personalities of women elementary teachers; (2) there appears to be a factor involved in the measurement of women's interests which is related to increasing age. The writer has hypothesized that the changing mores of society rather than increasing age itself tend to modify the stereotypes of different occupations and activities developed by women.

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AN EMPIRICAL INVESTIGATION OF THE EFFECTS OF NONNORMALITY AND HETEROGENEITY UPON THE F-TEST OF ANALYSIS OF VARIANCE

(Publication No. 4094)

Dee Wiswall Norton, Ph.D.
State University of Iowa, 1952

The F-test ($F = ms_g / ms_w$), commonly employed in simple-randomized experiments in psychological and educational research as a test of the null hypothesis concerning the means of several treatment groups, is a valid test of this hypothesis on the assumption that the treatment groups are random samples from normally distributed and equally variable treatment populations. The purpose of this thesis was to investigate empirically the effects on this F-test of failure to satisfy these assumptions.

Four general types of situations in which these assumptions may fail to be satisfied in educational and psychological research, and specific cases representative of each, were selected for investigation. The cases investigated are described in the following outline:

I Common nonnormality

Treatment populations equally variable but all having the same nonnormal form.

- | | |
|------------------------|-----------------|
| A. Extreme leptokurtic | D. Extreme Skew |
| B. Rectangular | E. J-Shape |
| C. Moderate Skew | |

II Heterogeneous variances

Treatment populations all normal but having different variances.

Three normal populations with variances of 25, 100 and 225 respectively were used in this phase of the investigation.

III Differences in form

Treatment population (approximately) equally variable but having different nonnormal forms.

Three populations, an extreme positive skew, a limited "normal," and an extreme negative skew were used. The variances of these populations were 6.2, 7.4 and 6.2 respectively.

IV Differences in form and variance

Treatment populations having different forms and different variances.

Four populations, varying in form from a J-shaped with limited range through decreasing degrees of skew to a normal population were used. The variances of these four populations were 2.24, 6.2, 10, and 15, respectively.

IBM equipment was used to draw about 3000 sets of k samples of n items each from the population (or populations) under investigation. The value of the mean square ratio, ms_g / ms_w , was obtained for each set and the resulting distribution of this statistic compared with the normal-theory F-distribution.

The results of this study indicate that the F-test may be employed to advantage in a wide variety of situations in which the assumptions underlying this test are

not satisfied. In no case did the estimated sampling distribution differ so markedly from the normal-theory F-distribution as to render unmodified applications of the F-test completely misleading.

The leptokurtic and rectangular populations gave rise to somewhat too many large values of the mean square ratio, particularly when the degrees of freedom were small. The distribution of ms_g/ms_w in sampling from the skewed distributions (including the J-shaped) fitted the normal-theory distribution very well, although there was a slight tendency for the relative frequencies in the upper-tail of the obtained distributions to be smaller than the relative frequencies in the corresponding normal-theory F-distribution.

In sampling from treatment populations differing in form, in variance, or in both form and variance from treatment to treatment, the relative frequency of large values of ms_g/ms_w was again greater than indicated by the F-table. Even in this case, however, with populations differing markedly in form and variance, only about 10 per cent of the mean square ratios exceeded the normal-theory 5%-point.

These brief comments should be interpreted with considerable caution. Accurate interpretation and utilization of the findings of this study requires careful reference to the description of the sampled population (or populations) and to the table in which the obtained distribution is compared with the corresponding normal-theory F-distribution. In this way, the researcher may obtain fairly accurate quantitative information regarding the true probability of a Type I error — or may determine the extent to which the ordinary F-table should be employed in order to make a test at the desired level.

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PRACTICES OF TEACHERS IN DEALING WITH PRESCHOOL CHILDREN

(Publication No. 4237)

Margaret Gardiner Rigney, Ph.D.
Columbia University, 1952

The purpose of this study was to find out what goes on in nursery school. The study also shows through comparison with results of another investigation how the nursery school educational experience differs from that in the home. Records were made during observations of the activities of seven teachers, including four head teachers and three student assistants in four schools, and of the responses of sixty-four children to these activities. The data thus gathered were analyzed according to (1) a set of categories that took account of the teacher's apparent pedagogical purpose; and (2) a set of categories dealing with the manner of approach. The method of analyzing the data was similar to that used by Gertrude G. Lafore in her study entitled Parent Practices in Dealing With Preschool Children.

The reliability of the observer and the workability of the categories were tested by the usual procedures.

Findings

1. The most conspicuous finding about the practices of teachers was the great amount of attention given to routines (approximately one-third of the total) and to enforcement of rules regarding property. Another large body of practices was concentrated on the promotion of children's interest and/or curiosity. Practices used less often were those that "appeared to be designed to contribute to the emotional well-being of the child." Teachers did not often use practices directed toward helping children understand the behavior of others or to encourage the acquisition of skill in social intercourse, motor development, safety, imagination, academic instruction, or language development.

The method or manner they displayed most often was "friendliness," "doing for the child," "participating with him" and "using reasoning." Practices used less often were interferes, dictates, diverts, bestows affection, praises, reassures, uses physical restraint or compulsion, encourages self help. Practices used infrequently were cautions, threats, ignoring, enjoying child's companionship, hurrying, blame, punishing.

2. The most conspicuous finding concerning children's behavior was the tendency to comply rather than to resist or rebel. Responses infrequently shown included crying, dictating, helping, displaying affection, seeking independence, teasing, manifesting hostility.

3. The number of contacts children had with the teachers varied; there was a tendency for the child who had many contacts with one teacher to have many contacts with the other teacher. Some children had very few contacts with either teacher.

4. The rating of the teachers' practices as to "adequacy" showed that the practices used by experienced and less experienced teachers were similar but that the less experienced teachers tended to do "too much" or "too little." Their practices appeared to be less well geared to the situation or to the child than they might have been.

5. The findings pertaining to practices used by teachers and by parents showed that parents used more extreme and opposite practices than did teachers.

The interpersonal relationship between a teacher and a child was not close; there was an arrestingly low incidence of very positive and of very negative aspects of emotional response.

Concluding Statement

The study supports the claim that the nursery school has an educational program rich in possibilities for learning. At the same time it raises the question whether too much attention and effort is being placed upon routines and upon rules regarding property in proportion to that paid to helping children to understand their own and others' behavior. The contrast between the emotional interchanges of teachers and parents may be interpreted to mean that by placing so much emphasis on physical and material concerns teachers are, perhaps, doing less than they might to promote emotional relationships and self-understanding.

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KINESTHESIS IN RELATION TO THE LEARNING OF SELECTED MOTOR SKILLS

(Publication No. 4102)

Louise L. Roloff, Ph.D.
State University of Iowa, 1952

Eight tests of kinesthesia were administered to two hundred subjects. A battery of four tests was selected and the following regression equation recommended:

$$.75 \text{ Balance Stick} - \text{Arm Raising} - \text{Weight Shifting} \\ + 4.7 \text{ Arm Circling} + 50$$

A kinesthesia score was computed for each subject by using this equation.

The correlation between motor ability T-scores and kinesthesia scores was found to be .43.

Skills clinic and bowling classes were selected for experimental study. The experimental group in each activity was taught by methods stressing the kinesthetic approach. Two classes in each activity were used as control groups. At the end of eight weeks of class instruction no significant differences were found between the control groups and the experimental groups. The experimental skills clinic classes were slightly better in volley ball skill than the control classes, the experimental group gained slightly more in motor ability. The experimental bowling group showed more gain in bowling ability than the control group but their final scores were very similar. Initial bowling scores and final bowling scores gave a correlation of a negative .76.

No significant correlation was found between kinesthesia and tennis performance.

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A COMPARISON OF MICHIGAN STATE COLLEGE FIRST TERM FRESHMAN DROPOUTS AND NON-DROPOUTS ACCORDING TO CERTAIN FACTORS

(Publication No. 4033)

James Ward Russell, Ph.D.
Michigan State College, 1952

The purpose of this study was to compare Michigan State College entering fall term freshmen who do not return for the winter term with those who do return for that term. The latter were designated as the non-dropouts and the former the dropouts. They were compared with respect to six factors: (1) scores on the American Council on Education Psychological Examination, (2) scores on the Basic College Inventory of Attitudes and Beliefs, (3) ratings on the High School Rating Scale of the Michigan State College Application Blank, (4) education of parents, (5) occupation of father and (6) sex.

The non-dropout group was composed of 393 students enrolled for the fall terms of 1948 and 1949. It was selected as a random sample of the 5,470

freshmen of those fall terms by the random number technique and found to be representative by ACE scores and sex.

The dropout group was composed of 373 students enrolled for the fall terms of 1948 and 1949.

A subgroup was formed and compared with the dropouts to see if during term dropouts differed from the total first term dropout group with respect to the factors studied. It was composed of 116 dropouts who did not finish the fall term and who did not give transfer, death in the family or serious injury as reason for leaving.

The data with respect to the six factors mentioned were found in the records of the Michigan State College.

The significance of the differences between the groups was determined factor by factor with either the analysis of variance or Chi square test of significance.

Significant differences were found to exist between the dropouts and non-dropouts for a number of factors. Entering fall term freshmen dropouts were found to have parents with lower socio-economic status and educational level than the non-dropouts. These dropouts tended to have less intelligence than did the non-dropouts. These differences were significant at the one per cent level of confidence.

Dropouts in comparison with non-dropouts were found to have less seriousness of purpose, less independence of effort and less participation in democratic processes. These differences were significant at the five per cent level of confidence.

Significant differences were not found to exist between the subgroup dropouts except for tractability. The dropouts were found to have the most tractability. This difference was significant at the five per cent level of confidence.

Since this land grant institution is supposed to offer as near equality of educational opportunity as possible for all, the data with respect to occupation of father and education of parents of Michigan State College students were compared with the Michigan and national Census figures.

Michigan State College non-dropouts had about eleven per cent of their fathers with occupations listed in the lower two socio-economic groups; for the state of Michigan forty-five per cent of the employed males were so classified.

Michigan State College non-dropouts had about thirty-six per cent of their parents with education beyond high school; for the country as a whole about fourteen per cent went to college.

The most significant differences found to exist between dropouts and non-dropouts were with respect to intelligence, education of parents and occupation of parents. Subgroup dropouts tended to differ a little but not much from dropouts.

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AN INTEGRATED PROGRAM IN AUDIO-VISUAL
EDUCATION FOR PROFESSIONAL
UNDERGRADUATE WOMEN IN
PHYSICAL EDUCATION

(Publication No. 4108)

Virginia Dix Sterling, Ph.D.
State University of Iowa, 1952

Lack of knowledge, experience and training inhibits teachers in making full use of the variety of audio-visual materials available in almost every subject field. The full curricula of teacher education programs, particularly that of physical education, limit enrollment in special audio-visual courses to the few students whose progress permits elective work. For the Department of Physical Education for Women, the State University of Iowa, a solution to the problem of adequate training may lie in the integration of audio-visual instruction in the professional curriculum in physical education.

This study was undertaken to obtain information regarding the degree of audio-visual competency needed by the graduate of the Department of Physical Education for Women for effective participation in programs of audio-visual education; to determine essential areas of audio-visual instruction; and to recommend procedures for the development of instruction integrated in the professional undergraduate courses in physical education.

An investigation was made of the extent of the audio-visual programs in the teaching situations of a selected group of graduates of the Department of Physical Education for Women, the State University of Iowa. Analysis of the data indicates that sufficient equipment and materials are available at all teaching levels to provide a basis for strong programs of audio-visual education, but that this potentiality is not being realized. The findings indicate also that teachers should be capable of assuming responsibility for their own audio-visual programs, familiar with sources of materials, and competent in the use of audio-visual equipment and materials.

This investigation was supplemented by recourse to the opinions of specialists to determine the instructional emphasis which should be given to specific skills and knowledges in an integrated program of audio-visual training. The comprehensive list of audio-visual competencies was submitted also to the graduate group for their designation of desirable emphasis. The composite ratings of the specialists and graduates recommended the majority of the competencies for inclusion in the program, and designated the emphasis to be given each item. The graduates and specialists were in complete agreement regarding the importance of including theory and practice of selection, utilization and evaluation techniques in the training program.

Two projects concerned with the selection and evaluation of audio-visual materials were carried on concurrently with the study of essential teacher competencies. The first of these acquainted the faculty of the Department of Physical Education for Women with University-owned audio-visual materials,

obtained their evaluation of these materials and established a pattern for future evaluation procedures.

The second project involved the use of a variety of audio-visual materials in the teaching of an activity class. Student evaluation of the project indicates that appreciation of audio-visual materials can be promoted by their regular use in an activity class. In addition, student evaluation of the materials used in the project provides information regarding the relative effectiveness of the materials, and suggestions for their improvement.

Among the recommendations for the development of an integrated training program were the suggestions that the list of essential teacher competencies be used as a guide in developing units of instruction, and in indicating standards for teacher training; that the specific activities of the instructional program be determined through cooperative study by staff members with the guidance of the Bureau of Audio-Visual Instruction; and that training be characterized by regular and effective use of audio-visual methods and materials in all courses in physical education.

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A STUDY OF THE RELATIONSHIP OF
PHYSICAL FITNESS TO SUCCESS IN
SCHOOL AND TO PERSONALITY

(Publication No. 4114)

Robert John Weber, Ph.D.
State University of Iowa, 1952

The purposes of this study are to investigate (1) the relationship between physical fitness as measured by the Physical Efficiency Profile and success in school as measured by academic grades at the State University of Iowa and (2) the relationship between physical fitness and personality as measured by the Minnesota Multiphasic Personality Inventory.

The subjects used in this study were 246 freshman men who were required to take physical education at the State University of Iowa during the school year 1950-51. The physical fitness of each subject was measured by the Physical Efficiency Profile as given by the Division of Physical Education, State University of Iowa. This measuring instrument consists of sit-ups for two minutes, pull-ups, one hundred yard pick-a-back run, and three hundred yard shuttle run.

Success in school is denoted as the grade-point average earned for the freshman year based upon the grading system of A-B-C-D-F. The grade-point averages were derived by totaling the grade-points for the year and dividing this score by the total number of hours carried. The entrance examinations, which provide seven separate measures of achievement, were also considered.

The measuring instrument for personality in this study was the Minnesota Multiphasic Personality Inventory. It is a psychometric instrument designed to provide, in a single test, scores on all the more important phases of personality.

The physical fitness scores were correlated with yearly grade-point averages. The result of the coefficient of correlation was .41, which was significant at the one per cent level. This indicates, in this study, that physical fitness was a factor in the achievement of academic success the freshman year.

The physical fitness scores were then correlated with the scores of the seven tests comprising the entrance examination. The coefficients of correlation were so low, for the group examined in this study, that it was assumed there was no relationship between physical fitness and each of the seven tests of achievement in the entrance examination.

There is a significant coefficient of correlation of .51 between the composite test scores of the entrance examinations and the yearly grade-point averages for each student. A multiple correlation was computed in which physical fitness scores were correlated with the yearly grade-point averages. This resulted in a significant coefficient of multiple correlation of .666.

The physical fitness scores were correlated with the nine measures of personality in the Minnesota Multiphasic Personality Inventory. The coefficients of correlation were so low, for the group tested in this study, that it was assumed there was no relationship between physical fitness and personality.

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A COMPARATIVE STUDY OF METHODOLOGIES FOR TEACHING GYMNASTICS AND TUMBLING

(Publication No. 4116)

Ralph Lee Wickstrom, Ph.D.
State University of Iowa, 1952

Purpose

To determine whether the whole method or the whole-direct repetitive method was more effective in teaching gymnastic and tumbling stunts on the elementary and intermediate levels of difficulty.

Procedure

Twenty-seven college freshmen from the required physical education program at the State University of Iowa were used as subjects. They were divided into two groups, equated on the basis of chinning strength, abdominal strength, motor educability and general motor capacity. The two groups met at different periods and were taught according to one of the two experimental methods. Each group met twice each week for a full hour of participation for a period of fourteen weeks.

Fifteen stunts on the tumbling mats, sixteen stunts on the parallel bars and seventeen stunts on the horizontal bar were selected from various sources as representative stunts, progressing in difficulty from elementary to intermediate. The form for each of these stunts was described in detail and analyzed in terms of known mechanical principles. From the total number of stunts, three on the tumbling mat, three on the parallel bars and four on the horizontal bar were selected

as stunts which were of sufficient difficulty to provide quantitative differences in learning among the subjects, and yet were within the scope of learning for each subject, within the time range of the experiment.

In order to familiarize the subjects with the apparatus, simple introductory skills were presented before the experiment began and during the early periods of the experiment. The sequences for presentation of stunts on the horizontal bar, parallel bars and tumbling mat were as follows:

Horizontal Bar

1. From front hang, back circle under bar to back hang.
2. Front Pull-over.
3. Hockswing dismount.*
4. Backward double hand-knee circles.*
5. Ordinary upstart.*
6. Front heel upstart from under bar to side seat.*

Parallel Bars

1. Jump Mount.
2. Rear Vault Dismount.
3. Front Vault Dismount.
4. Shoulder Balance.*
5. Upperarm Hang Upstart.*
6. Back Uprise.*

Tumbling

1. Forward Roll.
2. Long Dive.
3. Squat Balance.
4. Back roll snap-down.*
5. Handspring.*
6. Snap-Up.*

*Stunts selected for teaching using the two experimental methods. Other stunts were taught to both groups by the whole method.

Of the various methods of teaching, the whole method and the whole-direct repetitive methods appeared to be the most practicable for teaching gymnastics and tumbling. (1) The whole method: The stunt was demonstrated and then described in detail. It was demonstrated and described a second time, and any questions relative to the instructions were answered. The subjects then began to practice the stunt as a whole. If there were errors in performance, the necessary corrections in form were made until the reason for failure was eliminated. The stunt was always practiced as a whole until it was learned. (In this study the criterion for learning was three consecutive, successful performances of the stunt). (2) The whole-direct repetitive method: The stunt was demonstrated and then described in detail. It was demonstrated and described a second time, and any questions relative to the instructions were answered. When there were no further questions, it was assumed that the subjects all understood the nature of the whole stunt. The first part of the stunt was then demonstrated, described and demonstrated again. Each subject practiced the first part until he could execute it with the form required in performing the whole stunt. The combined first and second parts

were then described, demonstrated and practiced until learned. This procedure was continued until all of the parts were added and the whole stunt was learned.

Conclusion

The whole method was superior to the whole-direct repetitive method for teaching gymnastic and tumbling stunts both on the elementary and the intermediate levels of difficulty.

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THE USE OF ACHIEVEMENT TESTS IN GUIDANCE OF PHYSICAL EDUCATION PROFESSIONAL STUDENTS

(Publication No. 4118)

Shirley Winsberg, Ph.D.
State University of Iowa, 1952

Backgrounds of physical education major and graduate students vary greatly, and it is still a question as to whether the student's past experience in physical education is broad enough to enable her to classify herself in knowledge and skill of an activity. Some type of classification is advisable if the problem of individual differences is to be met and the girl developed to her greatest capacity.

The purposes of this study were to revise knowledge tests in fifteen physical education activities and to construct a knowledge test in bowling; to study the relationship between ratings on physical education activities by means of skill and knowledge tests and self-ratings made on a questionnaire type information sheet; and to study the reaction of physical education major and graduate students to the testing program for entering majors at the State University of Iowa.

The fifteen revised tests and the newly constructed one appear to be up-to-date, satisfactory measures of determining which entering students possess knowledge equivalent to that attained by students who have completed a beginning, formal course in the activity on the college or university level.

The major student in physical education tends, in general, to over-estimate rather than under-estimate her ability in activities when given the opportunity to rate herself but can make fairly accurate estimates of her ability in individual and rhythmical activities.

The students included in this investigation had a favorable attitude toward the testing program and objected mainly to the number of tests which were taken over a short period of time.

Microfilm copy of complete manuscript of 107 pages, \$1.34. Enlargements 6" x 8", 10¢ per page.

AN INVESTIGATION OF THE RELATIONSHIP BETWEEN THE SCIENCE INFORMATION POSSESSED BY NINTH GRADE GENERAL SCIENCE STUDENTS AND CERTAIN SCHOOL AND OUT-OF-SCHOOL SCIENCE EXPERIENCES

(Publication No. 4035)

John Henry Woodburn, Ph.D.
Michigan State College, 1952

This study was initiated to determine degrees of relationship between the science information possessed by ninth grade students and such school and out-of-school factors as intelligence, sex, membership in Scouts and 4H Clubs, interest in reading science books, social and economic home conditions, and prior instruction in science through the sixth, seventh, and eighth grades.

The data considered in this study consist of the initial and final scores of 1,973 ninth grade general science students on the Read General Science Test. Similar data were obtained from 198 ninth grade students who were not enrolled in general science through the year and also from 226 tenth grade biology students who had not taken general science through the ninth grade.

The classification of the students in categories representative of the school and out-of-school factors included in the study was based on the students' replies to questions on a personal information form, on their intelligence quotients obtained from school office files, and on information obtained from conferences and correspondence with their teachers.

The identity of relationship between a factor suspected of affecting the possession of science information was revealed by the comparison of the test scores of groups differing in degree of possession of the suspected factor.

The results obtained from the initial administration of the Read Test show that all three groups of students were familiar with nearly fifty per cent of the information covered by the Read Test. Significant gains were shown by each of the three groups with the ninth grade group who were taught general science making the greatest gain and the ninth grade group who were taught no general science making the least.

Whatever it is that gives a student an advantage in marking intelligence tests also gives that student an advantage in responding to the items on the Read Test. This is true both prior to and after instruction in general science. Intellectually bright and dull students have equal opportunities, however, to gain additional science information through classroom experiences.

Boys invariably show higher mean scores on the Read Test than do girls even though the girls in this study enjoyed a significant advantage in intelligence.

Scout or 4H Club experience, "good" home background, interest in reading science books, and prior instruction in science all show positive relationship with the possession of science information. With the exception of interest in reading science books, however, the superiority associated with each of these factors is overlapped by superiority in intellectual ability. None of the factors considered in this study appears to be significantly related to the students' gaining of additional science information while enrolled in general science classes.

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EDUCATION AND PSYCHOLOGY

TREATMENT OF WITHDRAWN CHILDREN
THROUGH EMPHASIS ON
UNMET EMOTIONAL NEEDS

(Publication No. 4137)

Irving Amdur, Ph.D.
New York University, 1952

This study was an effort to evaluate experimentally the emotional needs hypothesis of Louis E. Rath as an approach to the treatment of withdrawn children of elementary school age.

The underlying hypotheses of the study may be summarized as follows: As teachers try to identify and meet the frustrated emotional needs of withdrawn pupils through use of the diagnostic and therapeutic procedures associated with the emotional needs theory, these pupils will achieve certain socio-emotional, intellectual, and academic gains to a degree significantly exceeding both their original status in these particulars and the corresponding gains of a matched group of untreated pupils; in addition, these teachers will gain in general teaching effectiveness to a degree significantly beyond their initial effectiveness and significantly in excess of the gain in effectiveness of an approximately equivalent group of teachers who made no special effort to employ the emotional needs theory. Another prediction, called the convergence-divergence hypothesis, stipulated that treated children would converge upon, while untreated would diverge from, their mental age grade equivalents in reading and the "standard" auxodrome on the Wetzel Grid.

The experimental design devised to test these hypotheses made provision for two matched groups: an experimental group consisting of thirteen children and seven teachers and a control group of thirteen children and nine teachers. In the classroom of each of the teachers only one, two, or three children were involved in the experiment. At the start the two groups were almost entirely free of significant differences (at the .05 level) in means and in standard deviations in numerous quantitative criteria; the groups were also very similar in terms of various non-quantitative characteristics: sex, ethnic background and race, etc. The experimental teachers, having been trained by the investigator in a 30-hour in-service course and in subsequent group and individual conferences and working under the investigator's supervision, employed the experimental procedures for a six-month period. Evaluation techniques used before and after the experiment included: a social acceptance scale, a social inclination scale, sociometric tests, an introversion-extraversion test developed by the investigator, a scale of voluntary classroom participation, the Wishing Well (a test of emotional needs), anecdotal records, absence rate, standardized group tests of intelligence and reading ability, the Wetzel Grid, and a scale of general teaching effectiveness. For the first time in the history of emotional needs experiments, the investigator was a

practicing supervisor with a full load of administrative and supervisory work, rather than a full-time consultant exclusively concerned with the guidance of the experiment.

In almost every particular all the hypotheses (except the "convergence-divergence" hypothesis) were sustained by the data on unusually high levels of assurance; most of the probabilities were found to be below the .01 level. The most striking gains were those in the socio-emotional area. With respect to the convergence-divergence hypothesis, the data suggested revision of the concept: While the untreated children did in fact diverge very significantly from their expectancies in reading and physical growth during the experimental period, the treated children tended to retain their initial relative positions; a divergence-arrested divergence concept emerged from the data. (There was nothing in the data to preclude the possibility of an actual convergence phase if the experimental treatment were sustained for a longer period than six months.) No data were gathered on the permanence of the gains achieved by the experimental group.

In view of the highly positive findings in this study and in previous related studies by Feyereisen, Fults, Fleming, Burrell, and Park, the recommendation was advanced that the emotional needs theory and the practices associated with it be made an integral part of the teacher-training and parent education programs in America.

Microfilm copy of complete manuscript of 399 pages, \$4.99. Enlargements 6" x 8", 10¢ per page.

A STUDY OF THE RELATIONSHIP BETWEEN
SELF-AWARENESS AND SOCIAL SENSITIVITY

(Publication No. 3608)

Nathan Boxer, Ed.D.
New York University, 1952

The purpose of this investigation was to determine the relationship between an individual's estimate of his own status within a group and his ability to perceive adequately judgments and attitudes of his fellows. It was hypothesized that the accuracy with which an individual perceived his own status within his group (his self-awareness) would be associated with the accuracy with which he perceived the actually expressed judgments and attitudes of others (his social sensitivity).

The population consisted of two groups of psychiatric patients, totalling 13. All subjects were patients at the Veterans Administration Hospital, Bronx, New York.

To test the hypothesis two measures were employed: one of self-awareness and one of social sensitivity. The subjects' scores on the self-awareness variable were obtained by having every subject rank all the members of his group, including himself, on three aspects of behavior. Each subject's rankings of himself on these three aspects of behavior was

then compared with the median rankings which he obtained from the other members of his group. The absolute difference between his own ranking of himself and the median of the group's ranking of him was judged to be his self-awareness score.

The social sensitivity score was obtained by having every subject predict how each of the other group members would rank himself and the others on the same three aspects of behavior evaluated in the self-awareness test and by comparing every subject's prediction of every subject's rankings with the actual rankings of these other subjects. The rank order correlations of the subject's prediction of the rankings of the other subjects with the actual rankings of these other subjects were then converted into Fisher's z values and averaged to yield a single measure of the social sensitivity of each subject.

Both groups of subjects were given the self-awareness and social sensitivity test on two occasions. One week elapsed between the two administrations. The following results were obtained:

1. Test-retest correlations for the self-awareness scores of both groups were all found to be positive. Of the six coefficients three were significant at at least the .05 level.

2. Test-retest correlations for the social sensitivity scores of both groups were all found to be positive. Of these six coefficients, four were found to be significant at the .05 level.

3. The test-retest coefficients of both the self-awareness and social sensitivity measures were found to be less stable in regard to the subjects' assessment of their own and others' friendship status than in regard to the subjects' assessment of their own and others' husband and worker status.

4. A high degree of similarity between the test-retest coefficients obtained on the three aspects of behavior investigated when the two instruments were given to the two groups.

5. When the self-awareness scores were correlated with the relevant social sensitivity scores, a high degree of association was obtained. Of the twelve coefficients obtained, eight proved to be significant at the .05 level of confidence.

The inferences drawn from this study are as follows:

1. Self-awareness and social sensitivity on the aspects of behavior studied may be measured adequately, although somewhat more poorly in relation to friendship status than worker or husband status.

2. Dynamisms of repression and projection appear to exist when psychiatric patients are expressing self-awareness and social sensitivity.

3. There is a sufficiently high association between self-awareness and social sensitivity to imply an interrelation between these two variables. It is not clear from the data which of the two is the dependent and which is the independent variable, nor whether both are dependent upon some other variable.

Microfilm copy of complete manuscript of 108 pages, \$1.35. Enlargements 6" x 8", 10¢ per page.

STUDENT ATTITUDES TOWARD COUNSELORS AND THE COUNSELING CENTER AT MICHIGAN STATE COLLEGE

(Publication No. 4024)

Arnold Lincoln Form, Ph.D.
Michigan State College, 1952

This study is concerned with an analysis of student attitudes toward counseling and the Counseling Center at Michigan State College. It is based on the premise that the effectiveness of a counseling organization depends upon the degree to which its services are evaluated positively by those for whom they are intended. Specifically, the research is based upon four interrelated hypotheses:

1. Attitudes toward counseling and a guidance organization can be measured.

2. There is a climate of opinion among various groups of students which predispose them to appraise the counselors and the Counseling Center as favorable or unfavorable.

3. The attitudes that students hold toward counselors and the Counseling Center may be affected by common background characteristics and experiences.

4. The predisposing attitudes that students have toward counseling may be changed by direct contact with the Center.

The hypotheses were tested by an instrument which contained a Counseling Attitude Scale, counselor rating scales, student background items, and a free response section. The respondents were 544 students selected by a proportional stratified sampling technique.

Attitudes toward counselors and the Counseling Center were measured by the Counseling Attitude Scale specially devised for this research. The technique used was the Scale Discrimination Method of Edwards and Kilpatrick which is a synthesis of the Thurstone, Likert, and Guttman techniques of attitude scale construction. Scale analysis by the Cornell Technique indicated the scale probably measured a single dimension. The scale had a coefficient of reproducibility of 0.87 and its reliability of 0.94 was calculated by a lower bound technique. To measure student reaction toward the counselors' personal attributes and services, eighteen different rating scales were constructed.

Michigan State College students generally held favorable attitudes toward counselors and the Counseling Center. Approximately 84 per cent of the sample strongly endorsed the Center while 16 per cent held mild, indifferent, or negative attitudes toward it. Not all of the students based their attitudes from direct experience with the Center. More favorable attitudes toward the organization were engendered by a greater number of contacts with it.

To test whether differences in student attitudes toward the Center were associated with their background characteristics, the chi-square test was used. Where significant associations existed between any two variables, the degree of correlation

was found by the coefficient of contingency. Some of the important student background factors examined for their association to counseling attitudes were: sex, age, year in college, school enrolled, grade point average, number of extra-curricular activities, frequency of Center visits, nature of problem brought to the Center, previous counseling experience, size of community, and father's occupation.

Generally older students, upper-classmen, veterans, and married students had slightly more unfavorable attitudes toward counselors and the Center. Small and shifting differences were found between Center attitude and school enrolled, grade point average, activities, size of community, previous counseling experience, and socio-economic level. The findings confirmed the proposition that student attitudes toward counselors and the Center are affected by common backgrounds and experiences.

Microfilm copy of complete manuscript of 372 pages, \$4.65. Enlargements 6" x 8", 10¢ per page.

THE RELATIONSHIP OF THE ONSET OF PUBESCENCE TO CERTAIN INTERPERSONAL ATTITUDES IN GIRLS

(Publication No. 3615)

Abraham Gelfond, Ph.D.
New York University, 1952

The Problem

The problem was to investigate the impact of puberty on girls as evidenced by the direction and extent of certain modifications of interpersonal attitudes.

Method and Procedure

In the belief that one of the more meaningful ways of assessing personality is to study the manner in which an individual perceives himself in relation to others, specific attention was centered on girls' attitudes toward males of the same age, toward females of the same age, toward older males, toward older females, and toward themselves.

The burden of this study was to investigate attitudinal differences between girls of the same age, but with differential pubertal status. Twenty seven pairs of subjects were selected, nine pairs from each of the junior high school grades (seventh, eighth, and ninth). Both girls of each pair were within one month of the same age, but one had attained the menarche while the other was premenarcheal. This investigation was limited to essentially normal, white girls of the public schools of a suburban New Jersey community. All subjects had a minimum score of ninety on the intelligence test recorded on their cumulative record cards.

To determine attitudinal differences the

projective technique of telling stories from pictures was employed. The pictures used were from Symonds' Picture-Story Test and were administered according to Symonds' instructions. Scoring was accomplished according to the system developed by Fine. Only manifest content was scored. Comparisons were then made between the scores of (1) all premenarcheal and all postmenarcheal girls, (2) seventh grade premenarcheal and ninth grade postmenarcheal girls, and (3) seventh grade postmenarcheal and ninth grade premenarcheal girls.

Main Conclusions

At the junior high school age level girls have ambivalent attitudes toward other girls. Intense friendships and strong hostilities exist side by side or in cycles, typifying the mercurial nature of girls of this age.

The most consistently friendly attitudes toward other persons in their environment are reserved by girls for the boys in the peer group. Heterosexual interest exists on an amicable plane before and after the menarche. If these friendly feelings are not expressed easily, it is because our culture pattern makes it difficult for a girl to proclaim and act on her heterosexual interests. Early maturing girls are particularly penalized in this respect and react, generally, by inhibiting their heterosexual interests and feeling increased hostility toward the other girls of their own age group.

Contrary to the views of some writers on adolescence, there is no reason to suspect the existence of a homosexual stage in girls' development, nor a period of latent indifference to boys just prior to puberty.

On either side of the menarche girls are highly sensitive to the attitudes of both parents toward themselves. Puberty in itself brings no marked changes in girls' attitudes toward parents. However, extreme lateness in maturing stimulates closer ties between a girl and her mother.

Girls of junior high school age gravitate toward their peer group and away from their parents, irrespective of pubertal status.

Puberty brings feelings of indeterminacy tinged with pessimism and an end to the optimism of childhood. However, feelings of depression are very much a part of the late childhood experience.

Hostility and frustration characterize the whole junior high school period and seem to be elemental parts of growth. No particular shock, like the menarche, is required to stimulate these feelings.

Most emotions are not unduly affected by the menarche. This physiological development seems inadequate by itself to explain most manifestations of psychological and emotional behavior. The social field within which the child acts and is acted upon is a primary force in creating adolescent personality traits.

Microfilm copy of complete manuscript of 173 pages, \$2.16. Enlargements 6" x 8", 10¢ per page.

AN INVESTIGATION OF THE APPLICABILITY OF THE HUMAN FIGURE DRAWING IN PREDICTING IMPROVEMENT IN THERAPY

(Publication No. 3617)

Brigette Gutman, Ph.D.
New York University, 1952

This was an investigation of the applicability of the drawing of the human figure to the problem of psychotherapeutic prognostication. It was based upon the assumption that the spontaneous drawing of a person created by an individual gives personality characteristics and indications of the way in which the person looks at himself; and that there are certain personality characteristics which enhance the probability for successful therapy and certain others which are antagonistic to it and that differences between these two groups are measurable.

Selection of patients for the study proceeded in this manner: Each therapist who treated six or more patients in the out-patient clinic of Kings County Hospital was asked to give the names of those two of his patients who had benefited most from such treatment; and to give further the names of those two patients who had improved least in a period of at least six months. After elimination of patients who did not qualify in terms of age, intelligence, or history, and of those who had been diagnosed as psychotic, twenty patients remained in the improved and twenty in the unimproved group. A validation group of twenty patients was selected serially from the active file of the clinic.

A questionnaire filled out about each patient by his therapist aimed at objectifying and clarifying the concept of improvement as here used.

The pre-therapy figure drawing of each of the patients in the improved and unimproved groups were analyzed according to their structural details, proportions, and perspective. The placement, size, stance, and type of line were also considered in detail as were some combinations of characteristics. Differences between the groups in terms of drawing characteristics were evaluated statistically by means of the Chi Square formula and those which were found to be significant at or below the five per cent level were retained for inclusion in a syndrome of traits then to be applied to the validation group.

The thirteen statistically significant factors which were found to differentiate the two groups were the following:

1. Legs parallel; size greater than four inches
2. Same sex drawn larger; legs parallel
3. Same sex larger; assertive stance
4. Same sex larger with parallel legs and assertive stance
5. Line variability present
6. Assertive stance and parallel legs
7. Line variability; pressure 2 or less (5 point scale)
8. Same sex drawn first and more aggressive
9. Eyes piercing or blank
10. Pressure and continuity greater than 2 (five point scale)

11. No variability; continuity greater than 2.
12. Size less than four inches
13. No variability; continuity greater than 2

These items are divided into those (1-8) whose significance denotes improvement and those others (9-13) where the appearance of the significant factor is associated with non-improvement. Because the Chi Square of item 9 was more than twice as great as any other item, denoting that this factor (eyes piercing or blank) has a high degree of differentiating ability it was given double weight. A cumulative percentage graph showed that the best cut-off point between the algebraic totals of the improved and non-improved groups was at a score of +2; it was found that all unimproved patients had a score of +1 or less while 85% of the improved patients rated +2 or better on this scale.

When these factors were applied to the validation group and the cut-off point of +2 utilized, improvement was predicted correctly for 70% of the patients when the therapist's judgment of progress was used; when measured against the questionnaire ratings, 75% of the cases were predicted correctly.

Microfilm copy of complete manuscript of 109 pages, \$1.36. Enlargements 6" x 8", 10¢ per page.

A FACTOR ANALYSIS OF THE WECHSLER INTELLIGENCE SCALE FOR CHILDREN

(Publication No. 4189)

Elizabeth Pauline Hagen, Ph.D.
Columbia University, 1952

The primary problem in this study was to test the hypothesis that the general intellectual factor tends to decrease in importance as age increases. Two further problems of secondary importance were the comparisons of the factor patterns at the different age levels and the comparison of factor patterns computed from uncorrected correlations and those computed from intercorrelations which were corrected for the unreliability of the tests.

Subjects

The subjects used in the study were one hundred boys and one hundred girls at each of the age levels of five, seven, ten, thirteen, and fifteen. The subjects used were selected from a total of 2200 boys and girls between the ages of five and fifteen inclusive who were used to standardize the Wechsler Intelligence Scale for Children.

Materials

The instrument used in the analysis was the Wechsler Intelligence Scale for Children. Six verbal subtests and five performance subtests were used. The coding subtest, which is a part of the performance scale, was omitted from the analysis because it is a speed test; therefore, it was not possible to compute its reliability. A second reason for omitting

this test was that a different type of coding test was given to the five-and seven-year olds than was given to the other age groups.

Procedure

Two sets of intercorrelations were used in the analysis. The test intercorrelations were computed from the scaled scores of the subjects, and these intercorrelations were used for the first analysis. These intercorrelations were then corrected for attenuation and formed the basis of the second analysis. A factor analysis using Thurstone's method of multiple factor analysis was made of the eleven tests in each set of intercorrelations. The general factor was studied by comparing its contribution to the total test variance at each age level.

Results

The analysis indicated that the percentage of variance accounted for by the first factor is approximately the same at all age levels. It neither decreases nor increases consistently with an increase in age. At all age levels the general factor accounted for the greatest proportion of test variance. There was no consistent increase in the contribution of the group factors as age increased.

For all age levels a general factor and non-verbal factor appeared. The non-verbal factor did not include the same tests for all age groups. The factors beyond the second were unstable and accounted for a very small part of the variance. In the ten, thirteen, and fifteen year old groups the third factor which was extracted from the uncorrected correlations appeared to involve numerical ability, but the factor based on the corrected correlations was quite different and difficult to interpret.

The correction for attenuation increased the absolute values of the factor loadings of the tests, but the relative values of the first two factor loadings on the tests were about the same. The correction for attenuation had a greater effect on the factors beyond the second, which were relatively unstable and unimportant. There was very little relationship between these factors in the two analyses, and the correction for attenuation did not make the factors easier to interpret.

Microfilm copy of complete manuscript of 85 pages, \$1.06. Enlargements 6" x 8", 10¢ per page.

A STUDY OF THE STRUCTURAL ORGANIZATION OF STUDENT PERSONNEL SERVICES IN CERTAIN STATE COLLEGES AND UNIVERSITIES

(Publication No. 4038)

Ernest Edward Hanson, Ed.D.
Michigan State College, 1952

This study endeavored to determine the trends in the organizational structure of student personnel services in state supported colleges and universities

with enrollments of less than 5,000 students. The study sought answers to five major questions: (1) in what proportion of state colleges and universities is there a coordinated program of student personnel services; (2) who is responsible for its direction; (3) what student personnel services are provided; (4) for which functions are those concerned with student personnel services responsible; and, (5) what techniques are being used to coordinate the various elements of a student personnel program.

Data were obtained through the use of a questionnaire form, the examination of descriptive materials, and through personal interviews.

The findings revealed that there was a strongly significant trend toward the coordination of student personnel services with 67 per cent of the institutions with coordinated plans having reported putting their plans into effect since 1946. In 70 per cent of the institutions the coordination and direction of student personnel work was the responsibility of one person most commonly designated as the dean (director) of student personnel services or the dean of students. The chief personnel official was directly responsible to the president, served on the president's advisory committee, and was coordinate with other officials who were also directly responsible to the president.

The elements of a program of student personnel services being provided by more than 90 per cent of the institutions were: (1) selection and admission of students; (2) orientation; (3) part-time employment; (4) counseling; (5) social activities; (6) testing; (7) physical health program; (8) housing; (9) loans; (10) recreational activities; (11) student discipline; (12) food services; and, (13) cumulative personnel records. Remedial services in speech, reading, and study habits were provided in approximately 70 per cent of the institutions. Three-fifths of the schools reported a follow-up program and the continuing evaluation of the student personnel program. Slightly less than one-half of the institutions reported that they provided for a mental health program.

While numerous titles of persons or committees responsible for the various services were reported, those most frequently mentioned were: the registrar for selection, admission, and cumulative records; the deans of men and women for counseling, housing, discipline, and part-time employment; the dean (director) of student personnel services for testing and orientation; the college physician for physical health; the dietitian for food services; committees for social activities, loans, and scholarships; the physical education department for recreational activities; the director of placement for placement and follow-up; and, the student personnel committee for the evaluation of student personnel services.

Techniques found useful in coordinating personnel services were: (1) planned staff meetings; (2) bulletins, newsletters, and handbooks; (3) committees composed of personnel staff members, faculty and students; and (4) individual conferences.

Colleges and universities seemed to be increasingly aware of the need for complete understanding and adequate means of communication between the personnel workers, the students, faculty personnel,

and the administration if the student personnel program was to best serve the needs of the students.

Microfilm copy of complete manuscript of 184 pages, \$2.30. Enlargements 6" x 8", 10¢ per page.

A COMPARISON OF THE PERSONALITIES OF CHILDREN WITH AND WITHOUT DAY CARE CENTER EXPERIENCE: AN ANALYSIS OF THE PERSONALITIES OF TWO COMPARABLE GROUPS OF CHILDREN, USING MATCHED PAIRS, ONE CHILD IN EACH PAIR HAVING HAD AT LEAST ONE YEAR OF DAY CARE CENTER EXPERIENCE, AND THE OTHER NO ORGANIZED PRESCHOOL EXPERIENCE; UTILIZING A STRUCTURED INTERVIEW, PROJECTIVE PLAY WITH MINIATURE LIFE TOYS AND DIRECT "MICROSCOPIC OBSERVATIONS" AS BASES FOR THE ANALYSIS

(Publication No. 4141)

Henry Samuel Haskell, Ph.D.
New York University, 1952

This investigation attempts to answer the following questions:

1. Are there significant differences in the personalities of children with one or more years of day care center experience, in comparison to those of children of similar background with no organized preschool experiences?
2. If so, of what do these differences consist?
3. If so, might these differences be attributable to the fact that these children had or had not had day care center experiences?

Twenty first grade children, five each from day care centers rated "Excellent," "Good," "Fair" and "Marginal," were matched as closely as possible with children who had had no organized preschool experience on age, sex, socio-economic background, estimated intelligence, parental status, sibling status, ethnic background, race, general health and parents' employment.

Data on each child's personality were obtained through:

1. Six "microscopic observations" in varied school situations
2. Three half hour sessions with miniature life-toys
3. A structured interview

A personality portrait based on these data was drawn up for each child. Each child was rated on a seven point scale on each of fifty-four personality factors studied and comparisons were made between the matched pairs.

The major areas studied were:

External Security — Whether he felt the world around him was safe, friendly, good

Internal Security — Whether he felt loved and lovable, a good, worthy person

Acceptance — Social adjustment: relations with other children; friendships and enmities

Adequacy — Whether he felt and was capable of meeting the demands made on him

Sexual Adjustment — Whether he accepted his sex role; feelings for members of his own and the opposite sex

Reality — Whether well-rooted in the here-and-now; whether retreating into daydreams, fantasies

Imagination — Whether rich or skimpy, realistic or fantastic, creative or destructive

Attitude toward Authority — Whether accepting, submissive, defiant; whether expecting it to be friendly and just, or hostile and arbitrary

Attitude toward Conventions — Whether usually conforming, submissive, defiant or what

Inhibition — Whether overly inhibited, free within usual limits of the culture, or compulsively overstepping them

Overall Adjustment — Summary rating; whether generally well adjusted to living in this culture

This study provides the following answers to the questions raised:

1. The data indicate that for this sample significant personality differences were discovered which probably were causally related to day care center experience or the lack of it.
2. The following table gives the findings of this study in the major areas of personality studied:

TABLE I

Summary of Findings in Major Areas Studied

Area	Non		No	
	Day Care Children Favored	Day Care Children Favored	Neither Favored	Comparison Possible
External				
Security	8	4	7	1
Internal				
Security	4	4	9	3
Acceptance	8	1	10	1
Adequacy	5	1	14	0
Sexual				
Adjustment	6	1	12	1
Reality	4	2	14	0
Imagination	6	5	9	0
Authority	7	1	12	0
Conventions	8	1	11	0
Inhibitions	11	2	6	1
Overall				
Adjustment	10	4	6	0

3. For this sample, these differences can probably be attributed largely to the day care center experiences of the favored group.

Microfilm copy of complete manuscript of 248 pages, \$3.10. Enlargements 6" x 8", 10¢ per page.

THE PSYCHODYNAMICS OF STUTTERING:
AN EVALUATION OF THE FACTORS OF
AGGRESSION AND GUILT FEELINGS IN A
GROUP OF INSTITUTIONALIZED CHILDREN

(Publication No. 4144)

Louis Lowinger, Ph.D.
New York University, 1952

This study was concerned with the evaluation of the dynamic factors of aggression, guilt and orality in stuttering and the relation of these unconscious motivating elements to the overt aggressive behavior of the stuttering individual. This was done by determining aggression, guilt and orality in stutterers and nonstutterers and comparing these two groups with respect to the dynamic factors studied and for overt aggressive behavior.

The study involved 29 court-adjudged non-delinquent, neglected and orphaned institutionalized children of both sexes, and an equal number of individually matched controls ranging in ages from 8 to 15 years. All stutterers and controls had to fit the minimum requirements on age, absence of organic disorder of the nervous system, ability to cooperate and to give adequate and scorable responses on the projective tests used in the study. The Wechsler Intelligence Scale for Children was used for purposes of excluding mental defectives, that is, those who obtained an IQ of less than 70, either on the Verbal or the Performance Scale of the test.

The TAT and the Rosenzweig Frustration Test, Children's Form (F-T) were used for the evaluation of the dynamic factors of aggression and its repression, and guilt and its repression. Orality was determined on the basis of the TAT alone. The evaluation of overt behavior was based upon reports obtained from counselors, teachers and social workers. The summary of the findings with the TAT and F-T and the behavioral reports follows:

1. The stutterers did not differ significantly from the controls in the degree of the verbalized aggressive TAT phantasies. The stuttering girls were less aggressive than the boy stutterers and the differences were significant to the 5 per cent level or better. The nonstuttering girls were also less aggressive than the nonstuttering boys, but the differences were not significant.

2. The stutterers as a group were more guilt-burdened than the controls, but this difference was not significant. The stuttering girls reacted with a significantly lesser amount of guilt to their verbalized aggressive TAT phantasies than the stuttering boys or the nonstuttering girls.

3. The calculated correlations between TAT aggression and guilt ranged from an r of .63 to that of .84. These findings indicate that the expression of TAT aggression and guilt ran parallel to a highly significant degree for both the stutterers and the controls, that is, those children who gave many aggressive phantasies tended to react with a correspondingly high number of guilt-laden TAT stories, and vice versa.

4. The stutterers as a group did not differ from the nonstutterers and the girl stutterers and controls did not differ significantly from their respective male counterparts in the frequency and intensity of their aggressive and guilt F-T responses.

5. For both the stutterers and nonstutterers there was an inverse relationship between F-T manifested aggression and guilt. However, this correlation was without statistical significance.

6. As a group the stutterers did not differ significantly from the nonstutterers for the factor of orality. However, both the stuttering and nonstuttering girls manifested more orality than the boys and these differences were significant at the 1 and 2 per cent levels, respectively. The stuttering girls were more intensely oral than the nonstuttering girls, but this difference was not significant.

7. The stutterers were overtly less aggressive than the controls; the stuttering girls were less aggressive than the stuttering boys and the nonstuttering girls. But, these differences were not significant.

8. There was no significant relation between TAT and F-T elicited aggression and guilt and the overt aggressive behavior of the stutterers or of the controls.

9. The findings on aggression, guilt and orality did not reveal a dynamic pattern which may be said to be specific for stutterers.

Microfilm copy of complete manuscript of 221 pages, \$2.76. Enlargements 6" x 8", 10¢ per page.

ATTITUDE AS A CONDITIONER OF
THE ACQUISITION OF NEW FACTS
AMONG EIGHTH GRADE PUPILS

(Publication No. 4145)

George Mannello, Jr., Ph.D.
New York University, 1952

The Problem

What effect does one's attitude toward a certain subject have upon his ability to learn new knowledge about that subject? There is the tendency to accept information which harmonizes with our attitudes and reject that which is not in accordance with them. This hypothesis was tested under routine classroom conditions rather than a laboratory situation.

Procedure

The experiment was divided into two parts: (1) a materials preparation phase; and (2) a main study phase.

During the materials preparation phase the following tasks were completed:

1. Attitudes tests were selected. The generalized Remmers type scales were used.

2. Six attitude-areas were selected by preliminary tryout, two in which group attitude was generally favorably disposed toward the attitude-area, two in which the group was generally neutral, and two in which it was against. The attitude-areas were:

The Constitution - For
 The United Nations - For
 The Republican Party - Neutral
 The Negro - Neutral
 Dictatorship - Against
 Russian Communism - Against

3. A reading selection was composed for each attitude-area in which appeared five facts considered good about the subject, five neutral facts, and five undesirable. Each fact was tested with a preliminary group to determine its newness and then subjected to the decisions of two separate juries for status as to good, neutral or undesirable. Also, steps were taken to equalize the difficulty of the facts.

There were 69 subjects in the main study, who had not previously participated. Forty-four pupils made up an experimental population and twenty-five formed a control group.

The experiment was presented as a current events program, occurring one period a week during the course of the school term. Other, non-experimental material was sandwiched in between the experimental material to maintain the atmosphere of a natural classroom situation. The experimental group regularly took an attitudes test first, followed one week later by a reading selection and information test on the reading selection. The control group regularly took the attitudes test one week after the reading selection and information test.

The Results

The findings of this experiment indicate that the amount of relationship between one's social attitudes and the kind of information he learns is so small that attitude cannot be considered an important conditioner of learning.

When the number of attitude-conforming facts learned was compared with the number of attitude-opposing facts learned only 7.3 per cent of the group was substantially influenced by attitude in learning. Furthermore, the coefficients of correlation between attitude and kind of information learned yielded no correlation exceeding .28.

The statistics also indicate that the control group was slightly more influenced in learning in conformance with attitude than the experimental group. This means that the experimental group, which took an attitudes test first, may have been somewhat conditioned by this test in answering questions about the reading selection. The experimental group may have been more pro-con conscious as a result of the preliminary experience of taking an attitudes test, and thus slightly more aware of the "good" and "undesirable" facts contained within the reading selection than the control group was.

When academic achievement was compared with the amount of learning which took place in conformance with one's attitude it was found that there were no appreciable differences between above average, average and below average groups. No achievement group was more influenced by its attitudes in learning the experimental materials than any other group.

Conclusions

According to the limitations of this study the hypothesis is rejected that attitude conditions the learning of new content. At least the statistics of this thesis indicate that the amount of conditioning is so small as to be an unimportant factor.

Microfilm copy of complete manuscript of 249 pages, \$3.11. Enlargements 6" x 8", 10¢ per page.

A SURVEY OF CERTAIN ASPECTS OF PERSONNEL POLICIES IN MICHIGAN PUBLIC SCHOOL SYSTEMS

(Publication No. 4040)

Warner Elliott McClure, Ed.D.
 Michigan State College, 1952

Definition of the Problem

This study is a survey of certain aspects of personnel policies in forty of the larger public school systems of the lower peninsula of Michigan.

Scope of the Investigation

The study includes: (1) an investigation into the status of personnel policies to ascertain the extent to which personnel policies have been codified, how they are being codified, how they are introduced to the members of the teaching personnel; (2) an investigation into current practices and policies which seem directed toward making the working relationships of teachers more satisfying and the job of teaching more attractive. Eight broad areas of personnel policies and practices were selected for study:

1. Compensation for teachers
2. Teacher contracts
3. Leaves of absence
4. Community relationships
5. Arrangement of teaching loads
6. Shared planning and administration
7. Professional growth
8. Other aspects suggested by the superintendents.

Data Collected in Personal Interviews

The data were obtained in personal interviews conducted by the investigator with each of the superintendents. Replies to the questions, suggestions made by the superintendents, and information gathered as a result of an examination of records and other documents, comprise the data.

Findings and Conclusions

Only 37½ per cent of the school systems had written and codified personnel policies; 32½ per cent had fragments of their policies written; and 30 per cent had no policies in written form.

The study revealed that the systems which recognized the need for codifying policies and practices recognized also the need for making provisions for revising and altering them frequently.

Evidence such as the following may give rise to

feelings of dissatisfaction and possible frustration in the majority of the systems: (1) lack of techniques for giving teachers an effective voice in reaching decisions which affect their working conditions and personal welfare; (2) lack of techniques designed to enhance the teachers' feeling of status; (3) lack of long range plans for the professional growth of teachers; (4) lack of uniformity in giving credit for previous teaching experience when computing salaries for teachers; (6) lack of provision for keeping compensation sensitive to fluctuations in cost of living.

General agreement was found among the systems in: (1) providing for leaves of absence for sickness, or death or illness in the family; (2) the use of salary schedules; (3) accepting some responsibility for finding suitable living accommodation for teachers; (4) giving teachers social freedom in the community; (5) agreement that five classes per day as the teaching load should be the maximum; (6) the belief that the superintendent plays a major role in forming policies and practices which influence the working conditions of teachers.

More than ninety per cent of the superintendents cited additional techniques, employed by them which are proving successful in making the profession of teaching more attractive and working relationships more satisfying. These suggested techniques touched on seven areas of personnel administration and included: (1) the maintenance of friendly relations among teachers; (2) maintenance of friendly relations between teachers and administrative staff; (3) maintenance of desirable teacher-community relations; (4) sharing in planning and administration; (5) adequate compensation and financial aid; (6) status and evaluation; (7) provision for professional growth.

Evolving out of the study were certain basic considerations which appear to be essential in providing attractive and satisfying working relationships in the school system. These basic considerations were dealt with under three headings; (1) procedures in the development of personnel policies; (2) essential policies for better schools; (3) community and administrative relationships necessary for better schools.

Microfilm copy of complete manuscript of 286 pages, \$3.58. Enlargements 6" x 8", 10¢ per page.

A STUDY OF THE PERSONALITY OF THE ASTHMATIC ADULT MALE

(Publication No. 3621)

Leon Menaker, Ph.D.
New York University, 1952

The purpose of this study was to compare the personalities of adult males suffering from bronchial asthma with the personalities of normal non-asthmatic adult males in order to determine whether on the basis of objectively discernable aspects of test

performance the two groups could be differentiated, and whether or not there was a distinctive and uniform personality structure common to all asthmatics. The psychological instruments selected for exploring the personality of the subjects were the Rorschach, Thematic Apperception Test, and a Clinical Interview.

An experimental group of thirty-six asthmatic subjects and a control group of thirty-six normal non-asthmatic subjects were used in this study. All subjects were white, male veterans of World War II between the ages of nineteen and forty-four. All asthmatics were ambulatory, had no history of asthma antedating military service, and were receiving no medical treatment other than for asthma. The criteria for the selection of the control subjects were, answering "No" to all questions on a brief questionnaire constructed by the author, gaining a score within the range for normal subjects on the Cornell Index, and not undergoing any medical treatment at the time of the study. A further criterion for all subjects was that they had at no time undergone psychiatric treatment. The two groups were already equated for sex, color, and veteran status by the above outlined procedure employed in the selection of the subjects. In addition, they were equated in terms of age, I.Q., education, and occupation.

The analysis of the quantitative and qualitative aspects of the Rorschach performance of the asthmatic and control groups revealed both groups to be essentially similar. The scores, Fc, FC, and "orality", on which the asthmatic group differed significantly from the control group, suggested group trends among the asthmatics of greater apprehensiveness, more labile affect, and oral fixation. However, an "asthmatic syndrome" consisting of the Rorschach characteristics on which the asthmatic and control groups were different failed to discriminate reliably between the individual asthmatic and non-asthmatic subjects.

The Thematic Apperception Test stories were analyzed according to four main areas of ideational content: feelings, outcomes of the stories, interpersonal relationships with eight figures, and the general movement of relatedness regardless of the figures involved. Of the total number of variables on which the asthmatic and control groups were compared two significant differences occurred in the "feelings" category and in the "interpersonal relationships" category. These differences in both categories could be expected by chance.

Analysis of the interview data revealed vastly greater similarities than differences in the personality structure and functioning of both groups. The only differences were that significantly more asthmatics than controls reported a voracious appetite and persistent nail-biting in childhood. However, each of these conclusive differences effected less than a majority of asthmatics.

The conclusions reached in this investigation were that with respect to performance on the Rorschach, Thematic Apperception Test, and Clinical Interview, the asthmatic and control groups were essentially similar. What apparently can be distinguished for the asthmatics as a group by integrating the residual test differences between the asthmatic and control

groups are the following three broad reaction trends: (1) The asthmatics as a group tend to be less mature than normal non-asthmatics. (2) The asthmatics as a group tend to have greater underlying anxiety than normal non-asthmatics. (3) The asthmatics as a group tend to be more ambivalent in their general relatedness to wife-and-mother-figures than normal non-asthmatics.

The experimental findings and the weight of the evidence is against the existence of a typical and fixed "asthmatic personality" characteristic of all asthmatic subjects.

Microfilm copy of complete manuscript of 223 pages, \$2.79. Enlargements 6" x 8", 10¢ per page.

A STUDY OF THE RELATIVE EFFECTIVENESS OF TWO TECHNIQUES FOR IMPARTING OCCUPATIONAL INFORMATION

(Publication No. 3623)

Ray A. Miller, Ph.D.
New York University, 1952

The Problem and its Importance

The basic problem under investigation concerns the relative effectiveness of two techniques for imparting occupational information. These techniques are vocational films and job visits, both followed by discussion. An auxiliary aspect of the study permits an investigation of changes in interest patterns as a result of exposure to new occupational experiences.

The problem is important because occupations and jobs permeate the whole of our economic order. Upon adequate occupational information rests the possibility of adequate job choice. Adequate job choice is the forerunner to proper employment in a pleasing and worthwhile occupation.

The related literature indicated that many of the problems of youth are traceable to the absence of proper guidance about occupations prior to entry into these occupations. It was felt that much occupational maladjustment would be eliminated if students knew more about job conditions and job requirements prior to employment. The present investigation seeks to resolve the question of providing other techniques for teaching this information to high school and college students.

If this investigation leads to the establishment of the hypotheses educators will have other techniques which can be used in small and large schools alike to bring about greater understanding of occupations and jobs.

Design of the Study

The two experimental groups and the control group consisted of 33 students each, equated according to age, sex, intelligence, socio-economic status, previous work experience, previous courses in occupations, conditions of eye-sight and hearing, and self-estimated interests. The equating process

consisted of matching students in teams of threes based on information taken from test results, a questionnaire, and a personal interview. Tests used included the Otis Self-Administering Test of Mental Ability, Sims Score Card of Socio-Economic Status, and the Kuder Preference Record.

One experimental group visited ten industries while the other group saw ten vocational guidance films. The industries visited and the films shown were related to each other in terms of information obtained. Both groups received comparable instruction in terms of teaching time allowed per week during the experimental period, from February to June, 1951.

Gains in occupational information were measured by using the results of a validated examination on occupational information. Pre and post means, standard deviations, and standard errors were computed for each group. Differences between means were tested for significance.

Results of the Study

The visitation group showed more significant gains in occupational information than the film group and both experimental groups were superior, statistically, to the control group. The gains for the experimental groups were significant at the one per cent level of confidence. The statistics for the control group do not convincingly show that the results were not produced by mere chance, even though the control group was found to be higher in their knowledge of occupations and jobs at the beginning of the experiment. Both techniques were found nearly equally effective in teaching occupations.

None of the groups showed significant changes in interest patterns and only little change was noted among individuals.

The visitation group was superior to the film group in the number of "no occupational choice" answers on the examination blank. Greater stability of area of occupational choice was also noted in the visitation group as compared to the film and control groups. This superiority was significant in both cases at the .05 level.

Conclusions

1. Students learn about occupations and jobs when vocational films and job visits, both followed by discussion are employed as primary teaching techniques.

2. Both experimental techniques appear to be nearly equally effective as instructional tools in the areas under investigation.

3. Job visits yield more significant results than vocational films in terms of gains in occupational information, the selection of career choices, and stability in occupational choice.

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THE EFFECT OF PERIODIC AND APERIODIC ELECTRIC SHOCK ON SERIAL ROTE LEARNING

(Publication No. 4148)

Jesse S. Nirenberg, Ph.D.
New York University, 1952

Theoretically, recurrent noxious stimulation, by inducing anxiety, raises the drive level which should improve learning performance. However, it has been shown experimentally that anxiety increases perseveration, stimulus generalization, and inhibition. These effects tend to retard learning performance. In the present study human subjects were given shock periodically and aperiodically while learning a series of twelve nonsense syllables by the anticipation method to determine whether the facilitating or retarding effect of shock are greater.

Volunteers among students at the School of Education, New York University, were assigned in a random order as they appeared to three groups: a no shock group, a periodic shock group and an aperiodic shock group until there were twenty-four subjects in each group. The subjects were alternated within each group for two instructional conditions: (A) syllable presentation would continue for fifteen trials; and (B) syllable presentation would continue until two consecutive errorless trials occurred.

The periodic group received shocks at twenty second intervals while the aperiodic group were shocked at intervals of five, twenty and thirty-five seconds following each other in a random sequence. Each syllable in the series of twelve was exposed for five seconds in the window of a memory drum and syllable presentation continued for fifteen trials for each subject.

Learning curves and serial position error curves were plotted for the three shock groups (periodic, aperiodic and no shock) and for the two instructional groups. Learning curves were also plotted for subgroups: No shock-(A) instruction, no shock-(B) instruction, shock-(A) instruction and shock-(B) instruction where shock group data were obtained by averaging periodic and aperiodic data for each instructional group. In addition, factorial design analyses of variance were performed for shock and instructional differences among groups. The variables analyzed were: (1) group total number of correct responses; (2) perseverated responses; (3) responses given prior to correct position, one place prior and total of one and two places prior (stimulus position generalization); (4) commission errors; (5) omission errors (inhibition); and (6) partial responses.

The no shock curve surpassed both shock curves at all fourteen points. The B instruction curve surpassed the A curve at thirteen of the fourteen points. The shock-B curve was superior to the shock-A curve at only ten points. The no shock curve surpassed both shock curves and B was superior to A on the serial position error diagrams for shock and instruction conditions at eleven out of twelve points for each diagram. Omission errors were significantly

greater for periodic and aperiodic than for no shock at the five and one per cent levels of significance, respectively. Differences were not significant for other variables, nor were differential effects found for periodic and aperiodic shock.

It was concluded that: (1) Recurrent noxious stimulation tends to retard serial rote learning; (2) relating the learning situation to the cessation of noxious stimulation (B instruction) tends to facilitate learning; (3) recurrent noxious stimulation tends to increase inhibition (omission errors); and (4) the above effects apply over the entire series of syllables.

In the above conclusions the term, noxious stimulation, is limited in its use to electric shock as given under the conditions of this experiment.

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ATTITUDE AND INFORMATION AS SELECTIVE FACTORS IN REMEMBERING OF CONTROVERSIAL MATERIAL

(Publication No. 4244)

Maung Hla Thwin, Ph.D.
Columbia University, 1952

Remembering is a complex and dynamic response and many variables may be related to it in a given situation. The interaction of such factors as the ability to remember, the time period involved, the type of material that is presented as stimuli, relevant information, attitudes and interests have been generally recognized.

The present investigation was undertaken in a naturally occurring situation which seemed likely to produce modifications in information and attitudes of a college group. A college-wide conference was being held on the Marshall Plan and related aspects of American policy in Europe. The plan of the experiment was to present specific reading passages dealing with this controversial topic prior to the conference and to test immediate recall, recall after the conference, and recall a month later. Measures of attitude and information on the topic were also to be obtained at each testing and analysed in relation to memory score. In addition, the recall of an unrelated neutral passage was to be studied, and a measure of verbal ability obtained as an additional relevant variable.

It was anticipated that only part of the student group would attend the conference. Plans were therefore made to compare the post-conference scores on the memory tests and the other measures for those who attended and for those who did not attend the conference.

The subjects were 302 college students. 170 of these participated in the conference. The conference endorsed the present American policy in Europe and provided its members with much information regarding the merits of the Marshall Plan in particular.

The analysis of data was based on the scores of

each group on all the tests taken at the three sessions. The principal findings were:

1. Before the conference the scores of the two groups were not significantly different. This established the equivalence of the two groups.

2. After the conference the scores of the non-conference group showed no significant changes.

3. After the conference scores of the conference group on the attitude test, the information test and the memory tests on the two controversial passages became significantly different, beyond the .01 level, from those of the non-conference group. The changes showed: (a) a gain on the attitude test, which though reduced by a significant amount, remained significant after one month; (b) a gain on the information test which remained stable after one month; (c) a gain on the pre-passage memory test which was significant and remained so after one month; (d) a loss on the anti-passage memory test which was also significant and remained so after one month.

4. The number of item choices showing significant relationships with attitude increased from questions dealing with specific statements through questions requiring response by inference to questions affording evaluation of material.

The best possible interpretation for the critical changes in scores of the conference group, in the opinion of the experimenter, would be to regard the conference experience as having affected all three of the interacting variables in the situation, namely, attitude, information and memory for controversial material. There were "learnings" both in favorable attitude and information regarding the Policy and these "learnings" were carried over into the test situation. This same experience interfered with the reinstatement of the previously learned material on the antipassage resulting in a form of retroactive inhibition. Furthermore, as long as questions dealt with what was specifically stated, there was efficient recall. However, as the learning situation became less clearly structured either through an intervening experience or chances provided for value judgements, the relationship between memory and both attitude and information became more clearly established.

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HISTORY

THE INFLUENCE OF MILITARY RULE AND THE FREEDMEN'S BUREAU ON RECONSTRUCTION IN VIRGINIA, 1865-1870

(Publication No. 3968)

William T. Alderson, Ph.D.
Vanderbilt University, 1952

Reconstruction in the South may be divided into

three phases: Lincoln's and Johnson's attempts to restore states by means of provisional governments, congressional control of reconstruction through military governments, and Negro-radical attempts to rule the readmitted states through so-called carpet-bag governments. Federal military authority was important in all three phases. During most of the period of presidential reconstruction former Confederate states were subject to martial law administered by occupying troops. Congressional reconstruction placed these states under the nearly absolute authority of military commanders. And carpetbag governments, though primarily a product of state politics, relied heavily on army support to remain in power.

The military was a more important factor in the reconstruction of Virginia than in most southern states. Since Virginia escaped carpetbag government, the entire period of her reconstruction was characterized by direct rule of Federal military authorities. Moreover, Virginia was ruled by the military longer than were most southern states. Finally, Virginia's escape from post-restoration carpetbag government was largely due to the character of her military commanders during the period.

The purpose of this thesis is to examine reconstruction in Virginia with focus on the military. It is not a study of the techniques of military government, but a treatment of the effect of military government on the state; it is not a study of all aspects of reconstruction in Virginia, but a study only of those aspects which were directly affected by military rule.

The most important military activity in the state during the period of presidential reconstruction was the freedmen's bureau. Established on March 3, 1865, the bureau operated in Virginia from May 31, 1865, to June 30, 1870. It aided the educational efforts of northern benevolent organizations, protected schools and teachers against outrages, and helped establish about 350 Negro schools in the state, among them Hampton Institute. The bureau protected Negroes against discrimination by state courts, and for awhile administered justice to freedmen through special courts of its own creation. It aided Negroes in negotiating labor contracts, and transported them to places where employment was available. It also supplied food, clothing, shelter, and medical attention to freedmen who needed this assistance.

After passage of the reconstruction acts in March, 1867, importance of the military in the reconstruction of Virginia shifted from the bureau to military government. Virginia became the First Military District and was placed under the nearly absolute authority of General John M. Schofield, who served as commanding general from August 16, 1866, to June 1, 1868. Under Schofield's supervision delegates were elected to a radical-dominated convention which drew up a constitution disfranchising most Confederate officials and barring from office all persons who had aided or supported the Confederacy. Schofield refused to allow an immediate election on the constitution, however, and recommended that it be submitted at a later date with provision for separate vote on the proscriptive provisions.

General George Stoneman, who became military commander on June 1, 1868, continued his predecessor's opposition to radicalism. He dispensed patronage to moderate Republicans and used his official position to promote a coalition of moderate Republicans and conservatives for the purpose of securing readmission of the state under a non-proscriptive constitution. This coalition won a decisive victory in an election held on July 6, 1869. A moderate Republican was elected governor, and the constitution was adopted minus its proscriptive clauses. Six months later, on January 26, 1870, President Grant approved a congressional act readmitting the state to the Union, and reconstruction in Virginia came to an end.

The history of reconstruction in Virginia is primarily the history of military activities in the state from 1865 to 1870; and in these activities the policies of Generals Schofield and Stoneman are of the highest importance. Moderate in their social and political views, and with a genuine concern for the welfare of the people, they consistently opposed radicalism and sought, by effecting an alliance of moderate Republicans and conservatives, to facilitate the readmission of Virginia and to assure the state a stable government and a sound constitution. Schofield and Stoneman were largely responsible for Virginia's escape from the abuses which characterized military rule and carpetbag government in other southern states. Although these generals administered a congressionally created despotism, their rule tends to justify preceding the term despotism with the word "benevolent."

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**THE PHILADELPHIA NORTH AMERICAN:
A HISTORY, 1839-1925**

(Publication No. 4160)

Robert Louis Bloom, Ph.D.
Columbia University, 1952

This paper proposes to examine some phases of state, local, and national history for a period of eighty-six years as reflected in the pages of a metropolitan newspaper, the Philadelphia North American. Some of the journalistic currents of the period are related.

The North American was founded in 1839 by William Welsh and others in Philadelphia, a community already possessed of a long and honorable newspaper tradition. As a commercial and religious daily (except Sundays) it led a precarious existence until 1846 when George R. Graham, of Graham's Magazine, acquired it. By this time it was claiming to be America's oldest daily newspaper by virtue of its absorption in December, 1839, of Zachariah Poulson's Daily Advertiser, founded in 1784 in Philadelphia. Associated with Graham were a number of

notable editors, including Alexander Cummings, Jr., Robert T. Conrad, Robert M. Bird, and Morton McMichael.

Following a period of relative prosperity for the journal, Graham withdrew under a cloud in 1848, and the firm of "McMichael & Bird" took charge. Under their direction the North American was known as a staunch Whig advocate, opposing the Mexican War, favoring a protective tariff, but avoiding "ultra" pronouncements in respect to slavery. Always a booster for Philadelphia, the paper viewed all public policies as they served or failed to serve the commercial interests of the city. The editors were on comparatively intimate terms with such Whig leaders as Henry Clay and John M. Clayton, and their newspaper wielded influence in Whig party circles.

After Bird's death in 1854, McMichael assumed sole charge, and he dominated North American affairs until 1876. In the midcentury political crises, McMichael led the paper to a reluctant abandonment of Whiggism, a temporary flirtation with Know Nothingism, a futile hope for the Constitutional Union party, a hesitant acceptance of the Republican mantle, and eventually a whole-hearted radicalization after the assassination of Lincoln. During the Civil War, the proprietor loyally supported the Union cause and the Lincoln Administration. The paper mirrored the wartime home front problems of 1861-1865.

At first inclined to a liberal reconstruction policy, the journal became increasingly vehemently radical. It defended the Grant regime against all critics, but after McMichael's retirement in 1876, it settled into a Gilded Age somnolence under his two sons, Walter and Clayton. It became a thick and thin party organ, ready to accept "Cameronism" or "Quayism" so long as they could insure victories at the ballot box. A lack of editorial and managerial enterprise burdened the North American, and it grew steadily more conservative, denouncing Democrats, free trade, labor unions, civil service reform, silver coinage, and municipal reform. By 1899, it has lost so much prestige, influence, and circulation that it was waging a losing fight for existence.

During the turbulent Wanamaker-Quay political contests in Pennsylvania in 1899 the journal underwent a metamorphosis. Thomas B. Wanamaker purchased the paper, placed Edwin A. Van Valkenburg at the helm, and the North American began a notable career as an independent newspaper promoting reform principles. It swung behind both Theodore Roosevelt and Woodrow Wilson, although it remained nominally Republican. Wilson's neutrality and wartime policies, however, alienated Van Valkenburg, and in the post-war era it accepted Harding-Coolidge "Normalcy," albeit with some misgivings. Unable to secure the cooperation of the owners in respect to editorial and business policies in 1924, Van Valkenburg retired from the increasingly conservative journal in November. In May, 1925, the North American fell into the hands of Cyrus H.K. Curtis, who merged it with the Public Ledger. This resulted in the extinction of the octogenarian journal.

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**FRENCH THOUGHT ON THE NATION IN ARMS:
EVOLUTION AND CONSEQUENCES OF
A MILITARY THEORY, 1866-1939**

(Publication No. 4165)

Richard Delo Challener, Ph.D.
Columbia University, 1952

During the decade of revolution after 1789 the French developed the concept of the nation in arms — that is, basically, the idea of a military organization based upon universal service. Because this concept was closely associated with the revolutionary ideals of democracy and equality, it became an integral part of the republican ideological inheritance. Although both principle and practice were in abeyance during the Bourbon restoration and the Orleanist regime, the theory was never completely forgotten. After 1866 — when, in particular, Prussia showed that an army established upon universal, short-term service could win resounding victories — the concept of the nation in arms once more became a guiding principle for French military organization.

Up until the years of the First World War, French thought on the nation in arms concerned only the military relationship between the citizen and the state. Because of the particular importance of the army in French society, the concept produced loud and frequent political debate, and the principal arguments centered upon the political consequences of short-term, universal conscription. The republicans, confirmed believers in the theory, consistently advanced specific programs designed to put their ideas into practice. They argued that their theories would create an army which would not only be the best guarantee of the national defense but would also safeguard the nation from falling into the hands of reactionary officers. Conservatives in these years felt it necessary to combat the republican military theories. In their view, a short-service army was politically unreliable and, as a fighting force, unable to perform the efficiency of professional soldiers or conscripts who had spent at least a minimum of three to five years with the colors. Likewise, until the era of Jaures and the advent of evolutionary socialism, the French left rejected the concept of the nation in arms.

With the exception of the years immediately following 1871 and the period preceding 1914, the victory was won by the republicans. The laws of 1889 and 1905 put their theories into operation. This victory was made possible not only by the political decline of the conservatives but also because the French officers, as a class, came under the influence of German military thinking and themselves decided that only a mass army, based upon universal service, could provide the military force needed to meet new techniques of warfare. Moreover, the French Socialists changed their outlook to the point where they became advocates of a nation in arms established upon a militia basis.

After 1918 the political battle over the concept of the nation in arms became meaningless, and France

readily adopted an eighteen-month conscription policy. However, as a result of the industrial and economic aspects of the First World War, the concept of the nation in arms became a theory of total war. Now more than political in scope, French thought on the nation in arms concerned itself with the development of a body of doctrine designed to provide for the complete organization of the nation in time of war. Though the familiar phraseology was employed, the post-war concept dealt not merely with conscription policies but also with economic mobilization.

For a variety of reasons, in part political, ideological and military, the post-war concept became associated with defensive military strategies. It became the intellectual basis upon which the French constructed an army which was unable to meet the challenge of Germany in 1939-40.

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**AN INTELLECTUAL BIOGRAPHY OF
LINCOLN STEFFENS**

(Publication No. 4167)

Irving G. Cheslaw, Ph.D.
Columbia University, 1952

While *The Autobiography of Lincoln Steffens* has enjoyed a popularity equalled by few American autobiographies in the past half-century, a biographical study of Steffens was warranted for the obvious reason that biography and autobiography are two significantly different historical vehicles. The uncovering of a treasure of hitherto unused Steffens papers, containing letters to and from Steffens, scrapbooks, unpublished articles, and newspaper clippings paralleling his entire career, made it possible to trace his intellectual development through contemporary materials and to consider significant aspects of his life which were only casually mentioned in his own reminiscences. These include detailed consideration of his contemporary reputation, his relations with men of action in the progressive politics of the day, his view of himself as a reformer, his formula of revolutions, and, finally, his Communist partisanship.

Most of Steffens' colleagues in the literature of exposure have disclaimed any basic interest in reform, but Steffens did not, and could not, make a similar statement about himself. Early in his career as a newspaperman in New York, he observed the intricate network of corruption in the police department, and he began to speculate on the means to solve the problem. Several years before he began to write the magazine articles which brought him national fame, he noted the role of the political boss and the power of the party machine to frustrate the democratic workings of government as outlined in municipal charters and state constitutions. At a time when many were certain that corruption could be traced to public apathy, and that reform must come from the better elements of the community, Steffens observed

that it was precisely these people — the businessmen, the rich, and the well-born — who were the “bribe-givers” and who obstructed serious remedial efforts.

Because Steffens was a reformer as well as a newspaperman, he easily developed a close friendship with such men as Theodore Roosevelt, Robert La Follette, Joseph Folk, Everett Colby, Francis Heney, and Rudolph Spreckels. These men welcomed his presence, solicited his advice, and used him as a means of communicating with one another. Enjoying such influence, Steffens began to view himself as a “municipal architect” and he participated in ambitious social experiments in Boston and Los Angeles. When neither of these proved fruitful, he began to suspect that more was required than men of good will, and he turned his attention to broader solutions. Now “the system” had to be changed, and he optimistically observed the Mexican and Russian revolutions. When these did not quickly bring about the good society, he found solace in a theory of revolution. *Moses in Red*, a comparatively unknown book, represents Steffens’ great respect for strong leadership, his certainty that the existing social order needs a complete transformation, and his resignation to the fact that social change cannot be quickly accomplished. Since the Soviet Union was the only place where an integrated program of reform was being attempted, Steffens, to his death in 1936, held onto his optimism by endorsing the activities of the Communists.

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LABOR IN THE ECONOMY AND POLITICS
OF NEW YORK CITY, 1850-1860;
A STUDY OF THE IMPACT OF
EARLY INDUSTRIALISM

(Publication No. 4174)

Carl Neumann Degler, Ph.D.
Columbia University, 1952

This study is an investigation of New York City labor during a decade of profound industrial and political change — i.e., the 1850's, when industrialization was transforming the city's economy and the slavery issue was convulsing the nation's politics through the agency of the Republican party.

The subject matter lends itself to a three-fold division. Part I describes the institutions of labor and the ways in which they were employed during the period: the strike, the union, the central union, and the cooperative. The methodological technique employed is that of drawing conclusions from many examples and pieces of evidence garnered from the contemporary press and literature. Though in this part, organized labor, perforce, is the main concern, the unorganized used the strike weapon too, and are thus included.

The more direct effects of industrialism on labor in general are surveyed in Part II. The role

of women in industry, the effects of two depressions, the attraction of the West, the vocal opposition of labor leaders to the new industrialism, the impact of the immigrant on native labor, and labor's attitude toward the economic role of the state are each the subject of a chapter in this part.

Indicative of the growing industrialization of the city was the large part played by women in the working force. Census statistics indicated that several dozen industries had women as significant elements in their labor force; contemporary reports afforded an opportunity to describe the nature of women's work and the conditions under which they toiled.

Though it was difficult for workers to emigrate to the West, the evidence shows that thousands were willing to escape the city if only financial aid were offered. Under the influence of such a latent pool of migrants several philanthropic societies were founded during the decade in an effort to assist workers to leave the over-populated city. Thousands of adults and thousands of children were able to migrate in this manner to take up primarily urban occupations outside of the New York City labor market.

Radical workingmen during the period, prompted by two severe depressions, rested their solutions to unemployment on the proposition that government had a responsibility to find work for the jobless. Echoes of such views of the role of the state were to be found in labor's espousal of minimum wage laws and laws limiting work to ten and even eight hours a day.

Though New York had a large immigrant population very little animosity between native and immigrant labor was found even under the tensions of an advancing industrialism, for the simple reason that the overwhelming proportion of the labor force was of immigrant origin.

Part III is devoted to an investigation of labor's political activity and an examination of the effort of the new Republican party to enlist the support of the workingmen. Workingmen took little interest in independent political parties, and therefore gave no substantial support to the two or three ineffectual labor parties of the decade. Though the working class interest in the West was used by the Republican party to attract labor votes, the workingmen during the period consistently voted Democratic. This conclusion is established by a survey of the descriptive material and by a statistical analysis of the various elections of the decade.

Microfilm copy of complete manuscript of 360 pages, \$4.50. Enlargements 6" x 8", 10¢ per page.

THE LIFE AND WORK OF
HAYYIM JOSEPH DAVID AZULAI:
A STORY IN JEWISH CULTURAL HISTORY

(Publication No. 4181)

Theodore Friedman, Ph.D.
Columbia University, 1952

The Jewish community in Palestine in the eighteenth century presented certain unique aspects.

Religiously, the influence of the Safed School of mystics was still strong. Echoes of the Sabbatian movement were still to be heard. Economically, the community was growing increasingly dependent upon the largesse of Diaspora Jewry. The latter regarded the maintenance of scholars and schools in the Holy Land as a sacred obligation, though dissenting voices were to be heard here and there.

It was in this atmosphere that Hayyim Joseph David Azulai was born in Jerusalem in 1724. By training, he was destined to be a scholar; by family tradition, he was destined to take up the office of Palestine emissary.

His training consisted of studies under the tutelage of the outstanding Rabbinic scholars of Palestine of his time; men, who in their learning, combined the disciplines of both the Halakhah and the Kabbalah. His own voluminous writings, in almost every branch of traditional Jewish literature, give evidence of his enormous command of the field of Rabbis, including some of its neglected bypaths. What distinguishes his writings is his wide use of manuscript material. Early in his career, he developed an interest in books, manuscripts and their authors. An analysis of his bio-bibliographical dictionary, the *Shem Ha-Gedolim*, reveals both originality and a critical use of primary sources, many of which are known to us only through Azulai's references and quotations. His excursions, in this work, were pioneer efforts in the history of Jewish literature.

He undertook two tours on behalf of the Hebron community and its Yeshibah. These tours, extending over nine years, took him to the principal Jewish communities of North Africa and Western Europe. In his travel diary, the *Maagal Tob*, he recorded his experiences and observations of Jewish life. This diary reveals his activities as an emissary and the attitude toward Palestine of the communities he visited. It likewise affords us an intimate glimpse of the religious, social and cultural life of Jewry on the eve of the Emancipation. The deference paid to Azulai by the nobility he met bespeaks an attitude of friendliness towards Jews notably lacking in his encounters with the lower social classes. His diary reflects the growing weakening of Jewish communal control. Secular attitudes, tinged with skepticism were, for the first time, beginning to be felt within the Jewish community. Azulai's sermons were, in many instances, aimed at stemming the growing demand for a relaxation of the rigorous requirements of traditional Jewish law.

Taken together, his numerous writings reflect both the temper of his own mind and that of his times. Equally at home in the Halakhah and the Kabbalah, it is the latter, particularly the Lurianic Kabbalah, that completely dominated his religious views. In his legalistic writings, he invariably sought to accommodate the Halakhah to the Kabbalah. His preaching against the pursuit of worldly pleasures must, in the light of his reflections and observations in his travel diary, be regarded as a formalized habit of mind, a way of talking rather than a way of living.

Thus, in his time, other worldly goals were rapidly losing their operative force in Jewish life.

Microfilm copy of complete manuscript of 307 pages, \$3.84. Enlargements 6" x 8", 10¢ per page.

POLITICS AND PATRONAGE: THE NEW YORK CUSTOM HOUSE, 1852-1902

(Publication No. 4192)

William Jay Hartman, Ph.D.
Columbia University, 1952

During the last half of the nineteenth century the New York Custom House was the largest single federal office in the country and was the greatest patronage prize. Its more than a thousand relatively well paying offices were at the almost complete disposition of the Collector of the Port of New York. The Collectorship was an office of distinction and power. From fees, fines, and forfeiture money the annual salary of the Collector was larger than that of the President of the United States. The jobs he controlled made the political managers in New York dependent on his good will. Under the aggressive leadership of a man like Chester Arthur a powerful machine was built up and directed from the Custom House. Politicians who would work for the Conkling-Arthur machine, received berths in the Custom House from all over New York and neighboring states, and were then sent out to control party caucuses and conventions in their localities. Experienced political observers called the Collector, of all appointed officials, second in political importance only to the Secretary of Treasury.

The struggle to control the patronage of the Custom House often became so fierce as to aggravate appreciably and deepen the personal rivalries that existed within the parties. Despite the theory of the patronage which made it the cement that bound into one party diverse groups, the history of the Democratic and Republican Parties, in New York at least, demonstrates that the struggle to control the spoils often had a divisive effect.

Before the public conscience was aroused by scandals in the offices during the Grant era, the quiet work of civil service reform was begun in the Custom House by the distinguished Naval Officer, Silas Burt. He introduced competitive examinations in his department several years before the clamor of the reformers led to the writing of the Pendleton Bill. The Custom House, long regarded as a political engine, where the science of the spoils had been most highly developed, became the testing ground for civil service reform. When reform proved itself there, many were convinced that civil service could work anywhere; and Custom House experience was embodied in the Pendleton Act, which ironically enough was signed by the President who had been turned out of the Collectorship earlier because of his too close identification with machine politics.

The advance of civil service has not fully eliminated political influence from federal office, for large numbers of unclassified positions, usually on the executive levels, remain as patronage plums. Political machines, now denied the right to tax office holders, have been able to turn to Big Business for contributions. Yet there is no doubt that the average office holder is more secure and better treated under the new than the old system, and government service has been greatly improved.

Microfilm copy of complete manuscript of 373 pages, \$4.66. Enlargements 6" x 8", 10¢ per page.

STUDIES IN IRISH
ECCLESIASTICAL HISTORY, 1603-1615

(Publication No. 3986)

Grace Madeleine Hennigan, Ph.D.
Bryn Mawr, 1943

Three studies are here presented. The first is a narrative of the revolt which occurred in the spring of 1603. So far as is known to the writer, the various sources of information have never before been pieced together to present a complete and detailed picture. The material for the paper has been largely drawn from four contemporary accounts. The Chronicles by Farmer furnish the Protestant point of view, whereas Father White's report gives the attitude of the Catholics. The reaction of the administration is found in Moryson's Itinerary and in the "Declaration" printed in the Calendars of the Carew Manuscripts. These sources have been supplemented by many enlightening letters and despatches in the Calendars of State Papers, Ireland.

The second essay is a study of the interrelation of religious events in England and in Ireland, so far neglected by other writers. This treatment of the subject will help to clarify and explain the policy which the Dublin administration pursued in that country. No attempt has been made to present the English situation in detail, but merely to give a running comment as background for Irish events. For this reason a few standard works have been used for British affairs. Gardiner, as always, has been useful for general background, augmented by Pastor. The Calendars of State Papers Domestic have been useful, as have the Calendars of State Papers Venetian which show the reactions of Catholic diplomats in London. For Ireland itself, by far the most voluminous sources of information are the Calendars of State Papers Ireland. These are unusually full for the reign of James I, since they include not only the documents which are stored in the Public Record Office, but also all other acts, instructions, and correspondence between the king and his ministers and officials concerning affairs of state. The Hatfield Manuscripts, the manuscripts of the former College of Irish Franciscans at Louvain, the Earl of Egmont's manuscripts, and the Archives of the Jesuits in Ireland, all printed by the Historical Manuscripts

Commission have also been useful. Other valuable information has been found in Specilegium Ossoriense and in Archivium Hibernicum.

The third and last paper is an analytical study. The actual functioning of the Established Church on the basis of the visitation reports of 1604, 1607 and 1615 is described. Although the records are far from complete, nevertheless some idea of conditions in the state church can be gleaned from them and has never before been formulated.

Microfilm copy of complete manuscript of 482 pages, \$6.03. Enlargements 6" x 8", 10¢ per page.

THE DIOBELIA

(Publication No. 4195)

Robert B. Hennion, Ph.D.
Columbia University, 1952

The diobelia, an item appearing in the expense records of Athens during the Decelean War, has not yet been positively identified. The difficulties preventing final identification are: (1) paucity of ancient evidence, both epigraphic and literary; (2) incidental nature of the literary evidence.

Modern scholars have made various proposals for identification of the diobelia. A. Boeckh (c. 1815) thought it was identical with the theoricon; K.J. Beloch (1884) argued that it was dicasts' pay; U. von Wilamowitz-Moellendorff (1893) suggested that it was a dole designed to relieve those who had suffered loss through the Spartan occupation of Decelea and the revolt of Euboea. The last theory seems fundamentally correct; and, it may serve as a basis for further inquiry into the economic and political history of Athens.

The Athenian empire, both before and during the leadership of Pericles, seems to have been primarily beneficial to non-agricultural interests in Attica. Until the outbreak of the Peloponnesian War, however, imperial policy resulted in no particular loss for the agricultural interests. The limited loss to the agricultural group occasioned by the Archidamian phase of the War could have been mitigated by economic relief measures, obfuscated by military operations, and overshadowed by the plague. The Decelean phase resulted in a total loss for many members of the agricultural group; and, during this period, the state's capacity to provide relief was limited, military operations were different in nature, and there was no "greater calamity", such as the plague. Many members of the agricultural group, who — partially because they resided at inconvenient distances from the city — had been relatively inert from a political standpoint, were crowded into the city not for a month or two (as during the Archidamian phase), but throughout the year. It seems reasonable to assume that all these factors contributed to the consummation of the Revolution of the Four Hundred and to the subsequent establishment of the polity, as distinct from the former democracy.

The polity conferred franchise upon five thousand of those who were capable of providing themselves with arms, i.e., the hoplite class. Many of these citizens would come from the agricultural group; and they would be suffering a financial loss arising from the war in general, and the Spartan occupation of Decelea in particular. Little immediate relief was forthcoming because of the limitation of government expenditures, and the unwillingness of the Spartans to discuss peace on reasonable terms. Thus, for many members of the hoplite class, the prize of political victory was the dubious privilege of governing themselves as they sank deeper into poverty. The disfranchised, on the other hand, could hardly fail to be dissatisfied with a government which deprived them of political rights.

It is my proposal that Cleophon, who is said by Aristotle to have been the first to provide the *diobelia*, used (1) the *diobelia*, and (2) the fodder allowance for horses belonging to the knights, as relief measures for many of the war victims in the governing class in order to get their assent to a restoration of franchise to all Athenian citizens. I would, therefore, define the *diobelia* as a daily allowance of two obols to all who had been deprived of land and home by the Spartan occupation of Decelea.

If this proposal is correct, we have answers to two questions which arise in regard to the history of Athens: (1) How was the polity eliminated and the democracy restored? (2) When was the fodder allowance for Athenian knights not absent on campaign introduced?

Microfilm copy of complete manuscript of 92 pages, \$1.15. Enlargements 6" x 8", 10¢ per page.

ERA OF THE OATH: NORTHERN LOYALTY TESTS DURING THE CIVIL WAR AND RECONSTRUCTION

(Publication No. 4199)

Harold Melvin Hyman, Ph.D.
Columbia University, 1952

From the first days of the Civil War, Northern official policy combined with public opinion in a consistent demand for overt loyalty from civil and military servants. The demand came from many sources; from churchmen, business leaders, newspaper editors. Congress supplied the policy. Loyalty-conscious legislators sponsored measures designed to cleanse the Union's military forces and civil offices of pro-Southern sympathizers. In the Senate, Charles Sumner and Lyman Trumbull were prominent exponents of loyalty-testing laws. Representative John F. Potter of Wisconsin led an investigating committee which probed into the patriotism of hundreds of the government's employees.

By 1865 Congress had enacted a long list of laws designed to ascertain fidelity to the Union. Usually, these laws were in the form of loyalty oaths. With the ironclad test oath of July 2, 1862, Congress

perfected its basic tool for identifying the loyalty of Federal personnel, and made that oath a prerequisite for all who received government benefits, pleaded in Federal courts, or contracted with Federal departments. This law prescribed that the subscriber attest to his past Unionism. Under its provisions most Southern volunteers and Confederate leaders were barred from Federal offices and benefits. When, in 1864, Sumner prevailed upon Congress to pass a rule applying the ironclad oath to its members, this action effectively excluded almost every prominent Confederate from the national legislature in the future.

Lincoln and the executive departments applied Congress' loyalty-testing laws. Executive reconstruction policy came into conflict with these laws when, on December 8, 1863, Lincoln made an oath of future allegiance the test of political maturity for the repentant ex-rebel. Andrew Johnson fell heir to Lincoln's policies, and maintained the substance of Lincoln's oath in his reconstruction proclamation of March 29, 1865. Under the Presidential program Southerners formed new state governments and their Congressmen-elect sought admission to their seats. Radical leaders subjectively ascertained each applicant's ability to swear to the ironclad oath by standards amenable to political manipulation. The test oath became the focus of bitter political partisanship as Radicals successively excluded Democrats and moderates from Congress by denying men the opportunity to swear to it. Radicals won, Congressional reconstruction replaced Johnson's Southern state governments, and the test oath of past loyalty triumphed over Johnson's oath of future loyalty.

When the Supreme Court invalidated oaths of past loyalty as *ex post facto* and bills of attainder (*Cummings v. Missouri*, 4 Wallace, 277 [1867]; *Ex parte Garland*, *ibid.*, 333 [1867]), it received a share of the Radical attack which Johnson was experiencing.

Administratively, the Congressional test oath proved largely unworkable, particularly in the Treasury and Post Office Departments. The oath proved equally unworkable when Radical officials replaced Johnson's, when Radical reconstruction ruled the South, and when Radical Southerners sought Federal positions. Radical leaders had to resort to sophisticated political reasoning to justify placing their men into official posts in defiance of the test oath. In 1868 Congress modified the test oath so that Southerners whose disabilities it had removed under the Fourteenth Amendment might swear to future loyalty. Three years later Congress had to recognize that most ex-rebels were not disfranchised by that Amendment, but by the test oath, and prescribed an oath of future fidelity for all Southerners. The ironclad oath remained law, but applied only to Northerners. It became little more than an insignia of party respectability, the emblem of Radical purity. Democrats and moderate Republicans joined in continuing attacks on all loyalty-testing laws, until in 1884 the test oath was repealed.

Microfilm copy of complete manuscript of 456 pages, \$5.70. Enlargements 6" x 8", 10¢ per page.

JOHN ADAMS DIX: 1798-1897

(Publication No. 4210)

Martin Lichterman, Ph.D.
Columbia University, 1952

What places a man in the second rank of American history? The Life of John Adams Dix provides some answers to this question. Although Dix served his nation and state for over sixty years — as a soldier in two wars, as occupant of numerous important state and national offices, and as a leader of the Democratic Party — although he participated in great events and spoke in the country's highest councils, he was always on the periphery of power, never truly a prime mover of his times.

Blessed by good fortune, with an excellent academic training, assured of economic security by a generous father-in-law, endowed with intelligence and a spirit of *noblesse oblige*, Dix seemed well-prepared to achieve a full measure of greatness. Moreover, he served a brilliant political apprenticeship in Washington in the early Twenties and in Albany in the Thirties.

By the mid-Forties, Dix had served in several state offices and was a leader of the "Barnburner" wing of the New York Democracy. As the split in the Democratic ranks over slavery widened during the Mexican War, Dix, serving in the United States Senate, voiced free-soil views. But it was loyalty to Martin Van Buren and the Barnburners rather than strong anti-slavery sentiments that led Dix to accept the Free-Soil nomination for governor in 1848. Nevertheless, in the decade before the Civil War, when Dix returned to the Democratic Party, his taint of free-soilism so antagonized the Southern wing of the Party as to make advancement impossible. Not until the secession crisis itself in the closing days of Buchanan's administration, was Dix called to a position of national responsibility. Then, as Secretary of the Treasury, he restored order to the chaotic federal finances and tried with his Cabinet colleagues to stiffen Buchanan's policy toward the South.

Dix's war service as a major general was confined largely to rear-area commands at Baltimore, New York, and Fortress Monroe, but it gave him the opportunity to render distinguished service of an administrative and political nature.

In the transitional years after the war, success came to the men who were best able to adapt themselves to change. Dix tried to meet the changes, but only partly succeeded. His hesitancy, his indecisiveness in relinquishing old principles and allegiances to accept the newer, more fashionable ones, blocked his ambitions. Although some political prizes fell to Dix after the War — he was minister to France and later elected Republican governor of New York — he was never really able to learn the secret of political leadership in a nation whose parties were coalitions of divergent groups.

Dix's unpleasant experiences as a railroad president in the post-war period demonstrated that in business, as in politics, his reluctance or inability

to learn the new rules of the Age of Enterprise made it inevitable that he should play second fiddle to those who did.

These are some clues to Dix's career. Moreover, as Thurlow Weed said, he was "not a man of passion or excitement," and in the years of flaming issues he was thus often held suspect by both sides. Dix was never a bitter, tenacious fighter. Perhaps the ease of his early rise in public life had worked to undermine his perseverance and drive.

Microfilm copy of complete manuscript of 781 pages, \$9.77. Enlargements 6" x 8", 10¢ per page.

GEORGE B. McCLELLAN REEVALUATED

(Publication No. 4029)

Lewis Baltzell Mayhew, Ph.D.
Michigan State College, 1952

Of all the historical controversies concerning the American Civil War, none has generated more vehemence on the part of its protagonists than the polemics concerning the life and military service of Major General George B. McClellan. Because of strong feelings which have tended to place writers on the period in either a pro-or anti-McClellan position, the General's career has rarely been studied in terms of its intrinsic merits. Instead, interpretations of McClellan's role have been based upon the attitudes of individual writers toward related but not necessarily relevant personalities or events. Too frequently, opinions of the Peninsular Campaign of 1862 have been governed by whether a writer was strongly favorable or unfavorable toward Lincoln, or was sympathetic or antagonistic toward the Confederate position, instead of being limited to what McClellan as a military commander actually succeeded or failed in doing. This study is an attempt to reassess the contributions of McClellan as a responsible military leader who participated in a major war at a particular period in history. For the most part, attention has been focused upon his decisions and actions which were crucial in the conduct of operations, although some emphasis has necessarily been given to his personal relationships with the several key political figures who shared with him the responsibility for the safety of the Republic.

After the disastrous defeat of the Union army at Bull Run in the late summer of 1861 McClellan, at the call of Lincoln, assumed responsibility for the defense of the capital. Having provided for its safety by the creation of a strong, inter-locking series of forts, McClellan organized and trained the arriving levies of troops into a keen-edged, fighting tool — the Army of the Potomac. In spite of objections on the part of Lincoln and Secretary of War Stanton, McClellan launched his army on an offensive designed to flank the Confederate lines by attacking Richmond from the east. This well conceived plan was not implemented fully, however, for at the last moment Lincoln withheld the troops which the General had planned

to use as his mass of maneuver. In spite of the handicap thus imposed on him by his government, McClellan succeeded in driving his army close to the defenses of Richmond and had launched the attack designed to take that place when the Confederate general Lee commenced a spoiling attack. The Army of the Potomac parried the blow and occupied a new position on the James River from which operations could be undertaken against Richmond's axis of communications to the Southern hinterland. Before such an offensive could begin, however, Lincoln, on the advice of Stanton and the ineffective Halleck, recalled the troops to the vicinity of Washington where they were placed under the command of John Pope, leaving McClellan commanding an army with no troops. Although his strength was augmented by the addition of the veterans from the Peninsular Campaign, Pope lost control of his force and was defeated by the Confederates in the second battle of Bull Run. In the face of this second major setback McClellan was again called upon to save the capital.

The victorious Lee, meanwhile, began an invasion of Maryland. Acting quickly on the intelligence contained in a copy of Lee's march order, McClellan defeated Lee in two important actions: one at South Mountain and the other along the Antietam. As a result of these two setbacks Lee was driven back into Virginia. McClellan, after a period for reorganizing his troops, was able to begin his second offensive. When Lee interposed his divisions between Richmond and the advancing Federal army, Lincoln relieved McClellan from command, replacing him with the senior corps commander Burnside whose ineptness had cost so dearly at Antietam.

From a study of these campaigns one conclusion stands clear. McClellan, in spite of the fact that he did not destroy Lee's army, must be judged to have been one of the most successful, capable leaders to command Union troops during the American Civil War. Had his government not interfered at several crucial points, the war between the States might well have ended several years sooner than it did.

Microfilm copy of complete manuscript of 434 pages, \$5.43. Enlargements 6" x 8", 10¢ per page.

**THE STRUGGLE FOR POWER REFORMISM
IN THE FRENCH SOCIALIST PARTY
(SFIO) 1919-1939**

(Publication No. 4221)

Robert Osborn Mead, Ph.D.
Columbia University, 1952

The French Socialist Party (SFIO) was sharply divided between the two World Wars over the doctrine of reformism. This doctrine envisaged a gradual evolution toward the Socialist state by means of legal social reforms rather than by a violent revolution in the Marxist sense. The left-wing of the Party tended in general to maintain the traditional Marxian concepts of class war and

revolution, while the right-wing and center gradually embraced the evolutionary idea. External events worked in favor of reformism. The more important of these were the elimination of many of the extreme left-wing of the party by the Communist schism of Tours as a result of the Bolshevik Revolution, the attraction of non-proletarian elements to Socialism as a postwar and then depression panacea, and the peculiar position of the Socialists in the Chamber of Deputies.

Reformism was studiously nurtured by Socialist deputies in the French Chamber. They and other like-minded Socialists saw the possibility of gradually taking over the precincts of government by increased numerical power in the Chamber, by electoral cartels and alliances, by "participation" in the direction of government with the Radical Party and other left-center groups, and finally by the achievement of power through an overwhelming electoral victory. Such a bloodless conquest of power would be assured, they thought, when the electorate realized the virtues and benefits occurring from progressive Socialist reforms. The formation of a wholly Socialist cabinet would be tantamount to the first stage of the Revolution, and the Revolution would continue to progress along legal, republican, and democratic lines until the Socialist utopia was realized.

This study attempts to explore the history between 1919 and 1939 of the Socialist effort to achieve hegemony in the French state, particularly in the Chamber of Deputies, in successive cabinet formations, and in the annual national congresses of the Party.

Microfilm copy of complete manuscript of 303 pages, \$3.79. Enlargements 6" x 8", 10¢ per page.

SÃO PAULO CITY UNDER THE EMPIRE (1822-1889)

(Publication No. 4222)

Richard McGee Morse, Ph.D.
Columbia University, 1952

This dissertation is an interpretive history of São Paulo city, Brazil, from national independence (ca. 1820) to the republican period (ca. 1890). It draws subject matter from several realms of history (political, economic, religious, social, intellectual) and borrows techniques from social anthropology as well as from art and literary criticism. Its aim is an eclectic and integrated, rather than an encyclopedic and subdivided presentation.

This history of Latin America's most dramatic instance of urbanization partly complements the sociological case studies which Redfield and others have made of cultural change in Latin American communities. A more immediate purpose, however, is to suggest the specific configuration and interrelationships of São Paulo's development and to pose problems for future historical research.

The unifying theme is an attempt to show how, as the agrarian nucleus became a city, its leaders

and citizenry, privately and in association, became confronted at nearly every level of experience with an ever sharper necessity for assessing life-hopes and life-problems in abstract, intellectual terms and for constant planning, decision-making, and re-appraisal on that rational basis. In elaborating this theme subordinate ones are introduced, each coinciding with one of the year-spans covered by the five chapters. These chapters are planned as follows:

1. "Colonialism and New Stimulants (1820-1830)." The late-colonial town is described, with emphasis upon its isolation from the sea by the coastal range; its command of travel routes to the hinterland; the modest, subsistence economy of the environs; patriarchal class structure and customs; the socially integrating function of church ceremony; folkways of agrarian provincialism. São Paulo's role in national independence (1822) is then analyzed, together with certain "catalysts": loss of municipal autonomy under the new national Constitution; cosmopolitanism of the new provincial presidents; the city's first newspapers and its new Law Academy.

2. "Suspensive Years (1830-1845)." São Paulo undergoes a post-colonial malaise; the new "catalysts" are counteracted by provincialism and misoneism. The smothering of a liberal revolution in São Paulo (1842) and the subsequent visit of Emperor Pedro II (1846) finally integrate São Paulo into the national scene.

3. "Romanticism (1845-1855)." Law students give the city intellectual sophistication and social animation. The ideal of material progress is implemented by the Academy, the provincial presidents, and the nascent coffee boom to the northwest and is reflected in governmental policies and public works.

4. "Expectant Years (1855-1870)." A growing nucleus of middle-class foreigners and an increasingly articulate press make Paulistans impatient with residual colonialism. By 1870 city liberals have begun an abolitionist campaign, paving the way for mass immigration from Europe to the coffee fields; a railway network is under construction that will make São Paulo a distribution point between the port of Santos and a vast hinterland; and the Paraguayan War (1864-1870) has ended, making economic development more feasible.

5. "The Young Metropolis (1870-1890)." The coffee boom, the city's strategic location, and the opportunist temper of the times are reflected in: tumultuous, uncoordinated expansion; a fast-growing, polyglot population; industrialization; social fluidity, malaise, and conspicuous consumption; secularization; modishness and sophistication; prevalence of materialistic intellectual currents. In conclusion, a "complex of remorse" is detected which appears generic to any "modern urban society in which 'Logos' — or the quest for principles and for rational calculation of the isolated enterprise — transcends and denies the integral life-continuum, or tutelary 'demon,' of a traditional region. As the later metropolis grew in size and complexity, its citizens were increasingly to feel a need to apprehend

in the experience of living a sharper savor and a more meaningful totality."

Microfilm copy of complete manuscript of 367 pages, \$4.59. Enlargements 6" x 8", 10¢ per page.

THE ORIGIN AND EARLY DEVELOPMENT OF THE OFFICE OF PRIVATE SECRETARY TO THE SOVEREIGN

(Publication No. 4247)

Hogland Van Norden, Ph.D.
Columbia University, 1952

This study tells the story of the early and formative years in the history of an office that today plays an important role in the public life of Great Britain. Beginning with the inception of the Office of Private Secretary to the Sovereign in 1805, it traces its gradual development through the reigns of George IV and William IV, and the first half of the reign of Queen Victoria. For reasons given in the "Introduction", the author brings his work to a close with the death of General Grey in 1870.

The test stresses certain factors that constantly recur in the course of any research on this subject. The first of these is the tendency of the Office to reflect, at any given time, the constitutional and social status of the Monarchy which it serves. The second is the extent to which successive Private Secretaries mirror the prevailing climate of opinion among the influential classes of the day. The remaining factor lies in the increasing dependence of the Monarchy upon the holders of the Office for the orderly and efficient conduct of its business. In demonstrating the validity of these statements, this study covers a wide range of subjects involving the notable political and social events of the period under review. These include a discussion of Whig and Tory Reform, the emergence of the middle classes as the dominant force in the life of the British nation, and the gradual withdrawal of the Monarchy from its hitherto active role in politics.

This essay also offers a somewhat detailed account of the lives and activities of the eight individuals who successively serve as Private Secretaries during these years, for no complete understanding of the subject matter can be reached without an adequate knowledge of their strongly contrasting personalities. It points out how the tact and conscientiousness of a Sir Herbert Taylor, the raffishness and irresponsibility of a MacMahon or a Bloomfield, and the moral sobriety of a Prince who acts as his wife's secretary, all play their part in the gradual attainment of the Office of Private Secretary to an accepted and significant position among the servants of the Crown.

The author has made no attempt to write a social or political history of Great Britain during the first half of the nineteenth century. The fact, however, that so many events of a political and social nature have found mention within the confines of this study is clear evidence of the importance of the role

played by the Office of Private Secretary in the history of the times.

Microfilm copy of complete manuscript of 188 pages, \$2.35. Enlargements 6" x 8", 10¢ per page.

NYASALAND AND
NORTHERN RHODESIA, 1889-1924

(Publication No. 3629)

Norman Hall Pollock, Jr., Ph.D.
University of Pennsylvania, 1948

Nyasaland, first explored by David Livingstone about 1860, was settled by Scottish missionaries who were closely followed by Scottish traders and planters. The activities of these three groups prior to 1890 gave Great Britain substantial claims to the country, and in 1891, after a bitter dispute with Portugal which brought the two nations close to war, it was declared a British protectorate. During the first decade of British rule the administration was established and peace and order took the place of slave-trading and inter-tribal warfare. The next quarter-century was a period of transition. The native way of life was thrown into a state of flux as a result of the impact of European institutions on native political, economic, and social structures. Not only were these problems caused to a large degree by economic considerations, but their progress and solution also was dependent on the stability of the European economy. For that reason the economic history of Nyasaland from 1900 to 1924 furnishes the key to the understanding of all other developments in the protectorate.

In Northern Rhodesia, too, economic problems dominated the history of the territory. As a part of Rhodes' Cape-to-Cairo scheme, Northern Rhodesia became a part of the British Empire, administered by the British South Africa Company under the terms of the royal charter granted to the Company in 1889. Preoccupied with events in Southern Rhodesia for the next ten years, the Company almost completely ignored its possessions north of the Zambesi. From 1900 to 1910 some progress was made but that amounted to very little aside from the bringing of peace and order to the land. The minerals of the territory were indifferently explored and only a bare beginning was made to exploit them. The monopolistic policy of the British South Africa Company, combined with the greater attraction of the more highly mineralized ores in the Katanga district of the Belgian Congo, effectively prevented any real development in this, the main asset of the territory. Uncertainties as to the position of the Company with regard to the land, the scarcity of transportation, and high freight rates effectively discouraged farming on any noteworthy scale. By 1920 the dissatisfaction of the settlers with the Company's administration, and the Company's concern over the mounting annual deficit of the territory led to steps

which brought about the termination of the Company's administration in 1924.

Microfilm copy of complete manuscript of 558 pages, \$6.98. Enlargements 6" x 8", 10¢ per page.

THE ANTECEDENTS OF NAPOLEONIC WARFARE:
A STUDY OF MILITARY THEORY IN
EIGHTEENTH CENTURY FRANCE

(Publication No. 4232)

Robert Sherman Quimby, Ph.D.
Columbia University, 1952

The subject of this dissertation is the development of military theory in France during the Eighteenth Century and the transformation resulting therefrom in the French Army. The period covered is from the end of the War of the Spanish Succession to the outbreak of the Wars of the French Revolution. In addition there is a brief discussion of developments before the opening of the period and a longer discussion of the relation of the theory and resultant changes of the period to the great wars which began in 1792. The Seven Years' War not only comes midway in the period but also marks a natural division in the writings.

The disasters of the War of the Spanish Succession brought to a head the dissatisfaction with the system of linear tactics produced by the growing effectiveness of firearms. Several writers were concerned with finding some solution to the great difficulty of maneuvering large armies deployed in line. Folard, Saxe and Mesnil-Durand all proposed systems designed to obviate the difficulty. Unfortunately Folard, the first of these writers, did not draw a distinction between the period of maneuver and the period of combat. His system of massive columns was designed not merely for maneuver, where columns had great advantages, but also for combat where the line had the advantage in fire actions. He wished to use his columns to thrust home the attack. The effect of his work was to divert attention from the vital problem into the largely sterile discussion of the advantages of shock action versus fire action. This led to the long controversy between the advocates of the "thin order" and those of the "deep order", a controversy which was a central theme of the theoretical works of the century. Mesnil-Durand refined Folard's ideas and developed them in more extreme form.

At this point in the debate the Seven Years' War intervened. It led to two developments very important to subsequent tactics. First, there was a marked improvement in the organization of the battalion leading to greatly improved maneuverability. Second, there was the adoption of the divisional system, one of the most important developments in the history of modern tactics. It gave a greatly increased flexibility to armies not only by speeding up maneuvering but by making possible the easy handling of much larger armies than theretofore.

The lessons of the Seven Years' War were consolidated and expounded in the Essai Général de Tactique, by far the most important of all the military works of the Eighteenth Century. This was the work of Guibert. In it he set forth a complete set of petty tactics taking full advantage of the flexible new battalion. He also expounded a new system of grand tactics based upon the divisional system. He saw the necessity of using columns for maneuver and lines for combat.

Guibert was opposed by Mesnil-Durand who published in Fragments de Tactique a new system which, while proposing to maneuver in column, retained also the combat in column. The controversy now reached its climax, and finally at the famous Camp of Vaussieux the system of Mesnil-Durand, as far as most officers were concerned, was discredited in actual trial. After a period of domination by Prussian imitators led by Pirch, the tactics of Guibert finally won acceptance being embodied in the famous Ordinance of 1791 which for forty years was the official drill book of the French Army, used all through the wars from 1792 to 1815.

Napoleon in his military education also absorbed the doctrines of Guibert on the use of divisions in grand tactics and strategy. These doctrines were supplemented by the writings and practice of Bourcet. The Napoleonic system of warfare was essentially the application of the ideas of these two men and was based upon the system of petty tactics which had emerged from three quarters of a century's controversy and experience.

Finally the Eighteenth Century saw the development of a true field artillery, capable of accompanying and maneuvering with troops. This too Guibert seized upon and began the development of a doctrine for the employment of artillery in the field. Jean du Teil amplified and carried still further this task and the two men are the obvious sources of Napoleon's artillery doctrine. Guibert thus stands out as the key figure in all phases of military development during the period. He rightfully belongs among the great military theorists of all time.

Microfilm copy of complete manuscript of 488 pages, \$6.10. Enlargements 6" x 8", 10¢ per page.

INTERNATIONAL LAW AND RELATIONS

REPUBLICAN ATTITUDES TOWARD THE ADMINISTRATION'S CHINA POLICY, 1945-1949

(Publication No. 4105)

John Richard Skretting, Ph.D.
State University of Iowa, 1952

For many years the United States has been attached to China by ties of close friendship. The victory of the Communists in China and Chiang's

abandonment of the mainland in December of 1949 were therefore looked upon with sincere regret by most Americans. In addition, the balance of power had tilted, temporarily at least, a little more favorably toward the Soviet Union. One of the domestic consequences of this turn of events was an attempt to appraise American China policy since the end of the War to determine the reasons for such a loss and to establish responsibility for the setback. With this assessment emerged a partisan issue within the country.

The fundamental purpose of this dissertation is to determine the actual basis Republicans have for criticizing American China policy during this period. Subordinate to this major objective, and helping to achieve it, are three subpurposes: (1) to determine the extent to which the Administration policy between 1945 and 1949 could properly be labeled "Democratic policy" and the extent to which it was bipartisan, (2) to decide if a consistent Republican policy toward China could be said to have been developing since 1945 and, concomitantly, to note any divergent Republican opinions; and (3) to evaluate any alternative policy proposed to determine, in so far as possible, whether and how action according to Republican prescriptions might have altered the fate of China.

Determination of the actual basis Republicans have for criticizing the results of American policy toward China, 1945-1949, was achieved through an analysis of the records of Republican senators only. It was assumed that the speeches, articles, testimony and reports of these senators reflect all significant Republican attitudes.

Four threads run throughout the study. They are: (1) a survey of developments in China, (2) actions taken by the United States relevant to China, (3) Administration policies and reasons for the policy choices made, and (4) Republican reactions to Administration policies and reasons therefor.

The study shows that American China policy, while not bipartisan, was not completely Democratic either. During the first two years of the period covered, no Republican policy was evident. When Republican views developed, there were significant differences between what the Republicans said they favored and what they did in practice; this was true even during the Eightieth Congress, over which the Republicans had control. In words, they called for more support for Chiang Kai-shek. In action, they attempted to secure little more support than the Administration itself asked for, and on some occasions they even brought about reductions in requests for China aid which the Administration made. Even had Republican actions conformed to Republican words, it is doubtful whether there would have been any significant alteration of China's fate. There is considerable force to the argument that the collapse of the Nationalists is attributable to forces beyond the power of any foreign country to counteract; or, if they could have been counteracted, then extensive military intervention would have been required. Republicans did not call for such intervention even in words. The principal basis which the Republicans have for criticizing the Democrats is therefore simply this: that the

Democrats have been more closely associated with a policy that failed.

Microfilm copy of complete manuscript of 210 pages, \$2.63. Enlargements 6" x 8", 10¢ per page.

**TWO PROTECTORATE RELATIONSHIPS IN
THE INTERNATIONAL COMMUNITY:
FRANCE AND TUNISIA, FRANCE AND MOROCCO**

(Publication No. 4242)

Wendell Herbert Tewell, Ph.D.
Columbia University, 1952

The purpose of this study is to analyze the bases and the implications in international law of the creation and development of the protectorate relationships between France and Tunisia, and France and Morocco. The tendency of many studies of these protectorates has been to emphasize the relationship between the protector and the State under protectorate, in particular the protectorate treaties, and to give only secondary importance, if any, to the role of the other members of the international community in the creation and development of these relationships. In this study, the role of third States is given importance. Consequently, the terms of the protectorate treaties between France and Tunisia, and France and Morocco, are presented in the Introduction, Chapter I, while the terms and conditions of recognition of the protectorate relationships by interested third Powers are discussed in Chapters II and III. The relation of third States to the protectorates is developed further in the succeeding chapters on military occupation, war and sanctions, nationality, extradition, treaty relations, and consular and diplomatic relations.

In the chapter on military occupation the legal effect of the creation of the protectorate relationship upon the status of the French occupation forces is examined. The chapter on war and sanctions presents situations in which Tunisia and Morocco (French Zone) have been territorially assimilated to France. The chapter on nationality stresses the consequences of the fact that French nationality *jure soli* exists in Tunisia and Morocco (French Zone), while the chapter on extradition deals with the question whether Tunisians and Moroccans (French Zone), and Frenchmen found in the protectorates, fall within the category of individuals which France may refuse to extradite to third States. Three chapters are devoted to treaty relationships other than the treaties discussed in the chapter on extradition. In these chapters the extent to which the States under protectorate have participated in the treaty process is described and discussed. An examination is also made of the tendency of the protector and third States to confine the treaty process to a bilateral relationship which excludes the State under protectorate. The chapter on consular and diplomatic relations points out how relations between the protector, the State under protectorate, and third

States have been changed to meet the needs of the protectorate association.

Some general conclusions have been drawn. First, the rights, powers, and privileges which a protector exercises in the international community have been confined within the limiting and permissive conditions acceptable to the protector and third States. Second, the protectorate relationships appear to be an institutionalized way of differentiating as well as of balancing the rights and interests of the protector, third States, and the State under protectorate. Each respectively stands before the law not only as a State but also as a protector, third State, and State under protectorate.

Microfilm copy of complete manuscript of 278 pages, \$3.48. Enlargements 6" x 8", 10¢ per page.

POLITICAL SCIENCE

**THE EFFECT OF AN UNREASONABLE SEARCH
AND SEIZURE**

(Publication No. 4177)

Richard A. Edwards, Ph.D.
Columbia University, 1952

The Fourth Amendment to the Constitution prohibits unreasonable searches and seizures, but it does not prescribe the consequences of a violation of the Amendment. This study is an examination of the remedies available to the victim of an unreasonable search and seizure, including an evaluation of the so-called "federal rule" of excluding unreasonably seized evidence from the trial of the victim of the seizure.

Those who favor admission of unreasonably seized evidence, notably Dean Wigmore and Justice Cardozo, argue that to exclude such evidence creates a "collateral inquiry" in the criminal trial, subordinates the community interest to that of the individual defendant, departs from the common law acceptability of evidence without regard for its unlawful source, and is much less desirable than many alternative remedies for violations of the Amendment.

Those who oppose admission of unreasonably seized evidence, notably Justices Holmes and Brandeis, contend that relevant evidence is frequently excluded to protect interests far less important than those protected by the Amendment, that the community interest in protection from crime must be tempered by the community interest in eliminating lawlessness in law enforcement, and that the alternative remedies proposed by the Wigmoreans are illusory.

While the Wigmoreans have failed to secure rejection of the exclusionary rule in the federal courts, their influence has found expression in very restrictive procedural limitations such as the requirement of standing to suppress unreasonably seized evidence. Despite the relationship between the Fourth

Amendment and the Self-Incrimination Clause of the Fifth Amendment, the federal courts have refused to assign standing to all persons incriminated by the unreasonably seized evidence. Ownership of the premises searched and/or the property seized is regarded as an inadequate interest to give standing to challenge the seizure; possession, rather than title, is the crucial factor. By requiring a defendant to either claim possession of unreasonably seized contraband, or forfeit the right to challenge the seizure, the federal courts impose upon him the choice of surrendering the protection of either the Fourth Amendment or the Self-Incrimination Clause of the Fifth Amendment.

Compensatory remedies for unreasonable searches and seizures are illusory and inappropriate. To impose civil liability upon the affiant is to deter private persons from reporting well-founded belief that the criminal law has been violated. To impose such liability upon the magistrate issuing the warrant is to endanger the independence of the judiciary. The imposition of such liability upon the officer executing the warrant is unsatisfactory since his refusal to do so would create criminal liability on his part. Supreme Court vacillation on the necessity of a warrant has been such that officers conducting a search without a warrant should not be required to act at their peril. The measure of damages recoverable from any of these possible parties-defendant is usually far below the cost of the litigation itself.

Non-compensatory remedies are also unsatisfactory. Unreasonably seized contraband is excluded from the right to return of seized property, and the right to the return of non-contraband property is often subordinated to the government's interest in the use of such property as evidence. Equitable relief is of little utility since the victim rarely has advance warning of the search, and self-help would be at the risk of incurring criminal liability for what may later be shown to be authorized process.

Criminal liability for violations of the Fourth Amendment is an illusory sanction because statutory coverage of the subject is erratic and haphazard, and prosecutors could hardly be expected to punish their zealous subordinates.

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**BELGIUM AND THE BALANCE OF POWER:
A CRITICAL EXAMINATION OF SOME BALANCE
OF POWER THEORIES IN THE LIGHT
OF THE POLICY MOTIVATIONS OF
THE MAJOR EUROPEAN STATES
TOWARD BELGIUM, 1830-1839**

(Publication No. 4188)

Ernst Bernard Haas, Ph.D.
Columbia University, 1952

Purpose

In analytical writings on international relations

in recent years the term and concept of the balance of power has enjoyed a significant revival. Since the meanings and implications of the term are subject to considerable dispute and since it is not at all certain to what extent reasoning in terms of the balance of power has influenced policy making a clarification has been attempted in the instance of a single - though significant - historical situation: the settlement of the Belgian independence crisis, 1830-1839. This crisis was selected for these reasons: (1) the diplomatic protocols determining the settlement claim the balance of power as their supreme guiding maxim; (2) there were in existence at the time a number of political forces whose dominance might make the application of balance of power policies impossible, since they demanded courses inconsistent with balance reasoning. Such forces include (a) the demands of the liberal-nationalist ideology, (b) the demands of the conservative-legitimist-aristocratic ideology, (c) the needs imposed on parliamentary governments by pressing domestic crises, (d) demands of military security in localized areas, and (e) demands based on economic considerations alone. It has therefore been attempted to analyze and state the motivations of the chief statesman of Britain, France, Prussia, Austria and Russia in the effort to discover to what extent basic aspirations included balance of power considerations and to what extent the use of balance of power terminology in the diplomatic documents must be ascribed to propagandistic or rhetorical needs. This analysis implies that if the forces enumerated prevented the application of consistent balance of power rules in this crisis, a similar difficulty would arise in other crises during which the same - or parallel - inconsistent demands are in evidence.

Organization

Part I: Statement of the problem posed by the Belgian independence crisis.

Chapter 1: Analysis of the diplomatic and legal background of the crisis and description of the work of the London Conference in dealing with it.

Chapter 2: The problem of assessing individual and group motivations; the types of motivations which might be expected to demand realization; the degree of compatibility or incompatibility which the realization of these motives might pose with respect to balance of power policies; some meanings and assumptions of balance of power terms and balancing rules.

Part II: The assessment of motivations on the basis of the foreign policies of the five major powers, 1830-1839. Chapters 3 through 8 present a detailed diplomatic and political analysis of all the factors which entered into the settlement of the Belgian crisis, in terms of domestic politics, ideology and power considerations.

Part III. The role of the balance of power in the settlement.

Chapter 9: Detailed analysis of various theories and usages of the balance of power with a

comprehensive classification of historical usages, as found in the post-Renaissance literature on the subject.

Chapter 10: Examination of the views and principles of the major statesmen active during the crisis in the effort to assess their understanding and application of balance of power rules of conduct.

Chapter 11: Examination of the Belgian settlement in the effort to discover whether balancing principles were discernible, not in terms of deliberate diplomatic decisions, but in terms of automatic moves and counter-moves.

Chapter 12: The role of the balance of power as ideology in the Mannheimian sense; assumptions underlying consistent application of balancing rules to policy making; examination of the institutional possibilities of conducting balance of power policies in parliamentary and autocratic states; the institutional limitations on the faithful application of balancing rules under almost all modern conditions.

Conclusions

In general it was found that the consistent application of balancing rules is impossible under institutions which give free rein to political demands in a pluralistic society. It was demonstrated that the demands of various clashing groups could not be reconciled with standard balancing rules and that the policies followed therefore contradicted these rules. Furthermore, the existence of similar contradictory forces can be assumed as constants under modern parliamentary conditions. These conclusions are illustrated with examples from the policy making process and the dominant motives found in the Belgian independence crisis.

With reference to the motivations of particular men and groups toward the Belgian issue, it was concluded that (1) the French Left was impelled by ideological demands exclusively; (2) the French Center (i.e. the government) molded its policy almost entirely in accordance with the day-to-day demands of its delicate position in the Chamber of Deputies and the demands of various extra-parliamentary groups; (3) the British Tories were impelled both by ideology and by the desire to use a delicate issue to cause the fall of the ministry and thereby defeat the Reform Act of 1832; (4) the British Whigs were above all anxious to have a friendly regime in Paris to assure the international conditions necessary for electoral reform but took an anti-Belgian and anti-French stand when threatened in Parliament; (5) Palmerston alone acted on the basis of balance of power rules at certain times during the crisis and by no means consistently; (6) the Austrian government was interested only in using the crisis to bring about a firm conservative entente with Russia and Prussia, while preserving peace; (7) the Prussian Conservatives were impelled by ideology to prevent Belgian independence; (8) the Prussian "Liberals" were concerned only with drawing a favorable military boundary in the Rhineland and ending the crisis without war, without being impelled either by ideology or balancing considerations; (9) the Russian Czar was motivated exclusively by

ideology but (10) his plenipotentiaries in London were acting in accordance with balancing rules until 1832, when they too changed to a dominantly conservative ideological course, involving a major change in policy toward Austria, Britain and the Balkans.

Sources

These primary sources were found most useful: British and Foreign State Papers, F.F. Martens' Recueil, Colenbrander's Gedenkstukken, the Paris and London daily press, British and French parliamentary debates and the memoirs, letters and papers of Talleyrand, Laffitte, Périer, Molé, Broglie, Guizot, Thiers, Wellington, Aberdeen, Palmerston, Grey Durham, Stockmar, Ancillon, Metternich, Prokesch von Osten, Gentz and Princess Lieven. Biographies of all these and such additional personages as Sébastiani, Belliard, Pozzo di Borgo, Wessenberg, Nicholas I, Bernstorff, Bülow and Leopold I were used to a lesser degree. Standard histories (Stern, Thureau-Dangin, Hillebrand, Schiemann) and existing monographs on certain aspects of the crisis as well as the chief literature on the balance of power were, of course, utilized.

Microfilm copy of complete manuscript of 644 pages, \$8.05. Enlargements 6" x 8", 10¢ per page.

LEGISLATIVE RECORD OF REPUBLICANS IN THE SEVENTY-THIRD CONGRESS IN RELATION TO THE REPUBLICAN PLATFORM OF 1932 AND THE CAMPAIGN SPEECHES OF MR. HOOVER

(Publication No. 4069)

John Philip Hendrickson, Ph.D.
State University of Iowa, 1952

It is often said that national party platforms and presidential campaign speeches are meaningless. One method of testing the validity of this generalization is to examine these media of expression in order to determine if an adequate standard or guide is set forth. If the guide or standard exists, and there is a positive correlation between it and the record of the party in Congress, it may be said that the party is responsible. It has provided the voter with a program which he can accept or reject in terms of his own values. Moreover, the voter has had reasonable assurance of action in proportion to the degree of control his party has exercised over the governmental process. In any event, wherein both the majority and minority parties have made significant declarations and have given adequate expression to them through the medium provided in the formal processes of government, it can be said that responsible government exists.

In this study, the national platform and the presidential campaign speeches of the Republican party in 1932 have been summarized and analyzed and the results applied in an analysis of Republican action in the Seventy-third Congress. The attempt was to

determine the degree to which the campaign standard was a guide to Republicans in the subsequent Congress or to what degree it was an expression of the point of view of those elected under the Republican banner. Thus, the first step was an analysis of the Republican National Platform of 1932 and the campaign speeches of Mr. Hoover to determine the points of reference from which the action of Republicans in Congress could be interpreted. In comparing the platform with the campaign speeches, it was found that there were few, if any, contradictions or controversies between the two. Thus, the platform was supplemented and elaborated by Mr. Hoover in his speeches. It was found in conclusion that the Republican campaign emphasized the principles of cooperative individualism and restricted use of federal government reserve powers to meet the demands of the economic emergency. Moreover, particular recommendations made in the course of the campaign left little doubt concerning the stand of the Republican party on many of the important contemporary issues of that time. All in all an adequate guide was provided for Republicans in Congress.

The next step in the study was the application of the 1932 Republican campaign standard to Republican action in the first and second sessions of the Seventy-third Congress. It was determined as a result that there was a positive correlation between the legislative record of Republicans in the Seventy-third Congress and the 1932 Republican National Platform together with the Hoover campaign speeches. It was impossible to arrive at any definitive statistical conclusions, but it seemed clear that Republicans took a firm stand against those items considered most important in the New Deal program.

In the campaign of 1934, the Republicans were incapable of presenting a united front to the electorate. It appeared in effect that the 1932 program had been chucked, in view of the popularity of the Roosevelt program. But the party had been honestly represented to the people in 1932, and to a significant degree, had followed its stated principles and policies in the ensuing Congress. Thus, it may be said that, in the years covered, the Republican party was a responsible minority. Republican failures in 1934 are suggestive of a need for a biennial national party platform. Indeed, in almost every mid-term election, the minority party finds itself faced with many of the problems that confronted the Republicans at that particular time. It was not suggested that Republicans in the Seventy-third Congress used the 1932 platform as a constant guide or reference. But the platform did represent a common viewpoint. Thus, a mid-term platform convention might aid the minority party in attempts to develop a united front. Furthermore, it would aid the voter who must hold his representatives accountable.

Microfilm copy of complete manuscript of 349 pages, \$4.36. Enlargements 6" x 8", 10¢ per page.

CITIZEN PARTICIPATION IN INTERNATIONAL ORGANIZATIONS

(Publication No. 4001)

Sylvan Fred Jaenke, Ph.D.
University of Illinois, 1952

There is an increasing interest expressed today by citizens in the work of international organizations. The primary purpose of this study is to show evidences of this interest as witnessed by the participation of private citizens, either individually or through group action, in the formation and operation of international organizations. This study traces the trend in the nature, variety, and amount of citizen participation in the various forms of international organizations, both the non-governmental and intergovernmental types.

Information presented in the study has been gathered from a variety of sources, the chief source being official documents and publications from various international organizations. The writer has also received much valuable information from the personal letters of citizens who have been connected with various aspects of these international agencies.

A world association of free nations has been an aspiration of citizens for centuries. History records that many of the plans for world organization and many ideas for the improvement of the welfare of mankind have originated in the minds of private citizens. These early plans for world organization have had their effect on later developments in international organizations, and some of the social and humanitarian ideas have become realities.

In the century before World War I, the unofficial peace movement in America enlisted the support of many prominent and influential citizens in the crusade for a peaceful world. In this movement the peace societies have furnished the leadership and through the efforts of men and women of noble purpose, this century of pioneering for peace produced many notable leaders, a large amount of literature on the subject of war and peace, and a widespread public interest in the cause of peace and world organization. The individual projects and unofficial group plans influenced the establishment and nature of the League of Nations. One of the most practical plans was produced by the League to Enforce Peace, a private group composed of prominent citizens from many walks of life.

Despite the fact that the United States was not a member of the League of Nations, it is significant that a large number of citizens served in important positions in the Organization, and that there was an extensive amount of participation by unofficial groups in much of the social and humanitarian work of the League. Throughout its history, the League of Nations was interested in the work of non-governmental organizations, and it used the skill of "assessors" in many technical aspects of its work.

Under the United Nations there is even greater opportunity for citizen groups to participate in the work of the Organization and the specialized agencies. International non-governmental organizations have been recognized in the Charter and provisions

have been made to use this popular element in a consultative status. The United Nations Educational, Scientific, and Cultural Organization is one of the specialized agencies which seeks to become more intimately connected with the individual citizen, and which affords many opportunities for direct participation by private citizens and unofficial national and international groups. National organizations nominate the leaders who serve as their representatives on the United States National Commission for UNESCO. This Commission endeavors to make it possible for citizens to become better informed about the United Nations and the Specialized Agencies. It also suggests programs and projects which voluntary organizations of private citizens can use in order to promote better international understanding. The increased interest and participation of citizens in the work of international organizations is evidence of the sincere desire of individuals to promote understanding and cooperation with other peoples of the world.

Microfilm copy of complete manuscript of 305 pages, \$3.81. Enlargements 6" x 8", 10¢ per page.

WENDELL WILLKIE AND THE REPUBLICAN PARTY

(Publication No. 4002)

Donald Bruce Johnson, Ph.D.
University of Illinois, 1952

Wendell L. Willkie was a rare phenomenon in the pages of the history of American political parties. Born of pioneer German stock in Elwood, Indiana, in 1892, he rose to the leadership of the Republican Party through the unconventional route of corporation management. As the presidential candidate in 1940, Mr. Willkie polled more votes than any Republican nominee to this time. Moreover, in the period following his defeat by Franklin Roosevelt, Willkie more than any individual in the G.O.P., led his party away from the doctrine of isolationism, thus paving the way for America's entrance into a united community of nations dedicated to world peace. In the process, however, Willkie was rejected as the leader of the Republican party at the very time his doctrines were being accepted. This thesis, "Wendell Willkie and the Republican Party," is an endeavor to analyze and explain Mr. Willkie's role in the political history of the United States.

The strikingly unique feature of the Willkie saga is the fact that he ever obtained leadership in the Republican Party. Until the election of 1936, Willkie was an active Democrat, and at the time of his nomination in 1940, he was the president of a public utility holding company who had never been a candidate for political office. Mr. Willkie received national recognition as an opponent of the New Deal during his prolonged battle with the Tennessee Valley Authority over the issue of public power.

Through his extensive speaking and writing, he became known as a shrewd, articulate, and powerful champion of the business world.

Much has been written concerning Willkie's dramatic rise to national prominence. Through the media of mass communication, Wendell Willkie became a symbol of liberal Republicanism eminently qualified to challenge the Roosevelt Administration and philosophy. At the National Convention of 1940, he was able to capture the nomination because of his smoothly functioning *ad hoc* organization, his refreshing personality, and the pressure created by thousands of businessmen and Willkie club members throughout the country.

During his campaign, however, Mr. Willkie's amateurism emerged. He made irrational statements, astounded his followers by endorsing much of the New Deal program, and failed to draw the issues sharply. Nevertheless, in directing his campaign toward the great mass of independent voters, he staged one of the most dynamic political dramas ever placed before the American populace. He lost the election because not enough independent voters were convinced that he would be a superior substitute for the President.

Mr. Willkie's defeat in the 1940 election, however, was only the beginning of his claim to a place in history. In the four years which followed he became, through his theory of "loyal opposition," a world statesman for the cause of peace, but he lost the leadership of his adopted party. By 1944, when he again tried to obtain the Republican nomination, he was forced to campaign against the leaders of both parties, and the task proved to be insuperable. He died, in 1944, without declaring his preference in the forthcoming Presidential election.

Willkie's belief in the need for national unity and international cooperation placed him in a position in which he refused to make political compromises inconsistent with his principles. He never learned the fundamental rule of party loyalty, and he was disinterested in the organizational work that welds a party solidly behind a leader. Wendell Willkie was a political amateur all his life, but he was also a courageous, liberal, and ambitious man whose leadership played a decisive role in American history, though he never had an opportunity to place his policies into effect. He should be remembered, as he wanted to be remembered, as an individual who contributed to the saving of democracy at a critical moment.

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CONGRESSIONAL APPROPRIATION POLITICS:
A STUDY OF INSTITUTIONAL CONDITIONS
FOR EXPRESSING SUPPLY INTENT

(Publication No. 4220)

L. Dwaine Marvick, Ph.D.
Columbia University, 1952

The supply process is crucial to the Congressional oversight function. Oversight in turn is central in sustaining legislative influence in shaping policy.

Historically Congress intermittently exercised appropriation powers for oversight: initially to enforce legal accountability; after 1918 to cope with Executive policy-making initiative and to curb Executive recalcitrance. Analysis shows plateaus in federal spending and trends in the composition of the budget itself.

The LaFollette Committee saw how important oversight was for sustaining Congressional vitality. But the aptness of the appropriation process for oversight was slighted; legislative committees were to follow through on administration.

Supply committees have great advantages over legislative committees for oversight. Supply work, concerned with future programs, nevertheless deeply involves current performance records. Systematically ordered information exists for the overall federal program and for separate parts alike. Unlike remedial substantive legislation, supply bills are expedited. Supply intent can be enforced through either legal or extra-legal means.

Supply intent means Congressional intent expressed in the recorded history of a bill, since only then can the institution be said to exercise influence. The more explicit, appropriately sanctioned, and nearly unanimous is Congressional supply intent, the greater pressure to obey appears to fall upon the bureaucracy.

Supply powers are flexible. Formal clauses in the bill may authorize, limit, earmark, or prohibit; may aim at problems in one, several, or all programs. The supply process permits application of formal powers at any stage — subcommittee, committee, or chamber. Timing in the passage of bills is also significant.

Informally, chamber usage allows elaboration or challenge of committee intent during debate. Mild floor attacks may lead supply bill sponsors to expand their views or make verbal concessions. Stronger attacks — more likely to involve coalition than partisan alignments — may get the bill rewritten or may find committee intent formally endorsed and hence strengthened.

Senate economy-bloc tactics in 1950 suggest that an omnibus bill is the only feasible vehicle for across-the-board economy directives. The session also illustrates the importance of personalities on chamber alignments, and shows how difficult it is for chamber blocs to usurp committee prerogatives.

When Congress works through its committees, supply powers are most compelling. Alignments characteristically develop thus: subcommittees

stand solidly behind their bill; partisanship begins in full committee; opposition leadership in chamber debate usually comes from full committee members dissatisfied with the subcommittee version.

The basic Congressional supply intent is set by House committee and chamber deliberations. House appropriation subcommittees elaborate supply intent by: seeking voluntary written and oral commitments from bureaucrats; pressing for bureaucratic acceptance of legislative views; expressing subcommittee reservations, understandings, and complaints in the committee report.

House subcommittee work is first subject to full committee and chamber revision, and then to changes during a parallel Senate process. Senate subcommittees constitute appellate bodies, their agenda partly determined by Senatorial interests — partly by agency appeals from House intent. Appeals differ markedly, depending upon the specificity of House action.

Senators often change House versions merely to have "bargaining points" for conference negotiations. Conferences typically end with House victory on many peripheral points and Senate victory on a few central issues. The brevity of conference reports, plus Senatorial willingness to "take it to conference", often leave final Congressional supply intent beclouded.

To maximize the clarity and force of supply intent, chambers must work with, not against committees. Subcommittee members must cooperate with, not challenge agency officials. And Senate committee members must specialize, not duplicate House work.

Microfilm copy of complete manuscript of 426 pages, \$5.33. Enlargements 6" x 8", 10¢ per page.

DOMESTIC AND INTERNATIONAL INFLUENCES
ON CONSTITUTIONAL REVISION
IN JAPAN, 1945-1946

(Publication No. 4216)

Theodore Hart McNelly, Ph.D.
Columbia University, 1952

By "accepting" the Potsdam Declaration, the Japanese Government assumed the task of democratizing the political structure in accordance with the popular will.

General Douglas MacArthur, the Supreme Commander for the Allied Powers (SCAP), in October, 1945, urged Prince Konoye Fumimaro to take the lead in reforming the Japanese Constitution. The efforts of Konoye and his assistants, however, came to naught after the repudiation of Konoye by General MacArthur and Konoye's indictment as a war criminal.

On October 11, 1945, General MacArthur directed the Shidehara Cabinet to liberalize the Constitution. The Cabinet Committee on constitutional revision drafted a number of proposed textual changes for the 1889 Constitution which would have liberalized that

document but would not have impaired the principle that sovereignty resides in the Emperor.

The leading political parties and publicists in the winter of 1945-1946 published a wide variety of draft Constitutions ranging from mild revisions of the 1889 Constitution to the Communist Party's plan for a "Japanese People's Republic".

The conservative proposals for constitutional revision presented by the Japanese Cabinet to SCAP Headquarters in February, 1946, were considered inadequate and rejected *in toto* by General MacArthur. The Supreme Commander directed his Government Section to draft a Constitution which would state that sovereignty resides in the people, forever renounce war and the maintenance of armaments, and abolish the peerage. The Government Section's secretly prepared draft Constitution was delivered to the Japanese Cabinet on February 13, 1946, as a "guide".

After extended consultation with SCAP Headquarters, on March 6, 1946, the Japanese Cabinet published a draft Constitution which conformed in its essentials with the Government Section's draft, save that it provided for a bicameral rather than a unicameral legislature.

Although General MacArthur had at no time consulted with the Far Eastern Commission (the Allied policy-making body for Japan) concerning constitutional revision, he immediately made public his "full approval" of the March 6 draft Constitution.

The draft Constitution was of very minor importance in the April 10 election since all political parties save the Communist supported the general principles of the Government draft. On April 17, as the result of suggestions by language reformers and SCAP Headquarters, the Government issued the draft Constitution in colloquial Japanese.

The legal fiction was maintained by the Japanese Government that the proposed Constitution would constitute an amendment to the 1889 Constitution, and the procedure for amendment prescribed in the latter document was scrupulously adhered to.

The Ninetieth Diet, on October 7, 1946, passed almost unanimously the draft Constitution with a number of minor changes, some made on its own initiative with SCAP approval, and some made on the suggestion of SCAP, acting on policies adopted by the Far Eastern Commission. The Diet had been told by the Prime Minister that the enactment of such a Constitution was necessary to the fulfillment of the provisions of the Potsdam Declaration.

Originally drafted in General MacArthur's Headquarters and only slightly modified by the Japanese Diet, the new Japanese Constitution owes almost nothing to the efforts of the Japanese people or to the Allied Powers as a whole. It is almost entirely a MacArthur product.

Microfilm copy of complete manuscript of 451 pages, \$5.64. Enlargements 6" x 8", 10¢ per page.

GOVERNMENTAL REORGANIZATION IN IOWA

(Publication No. 4092)

George Francis Moore, Ph.D.
State University of Iowa, 1952

Two general governmental reorganization plans have been proposed for the State of Iowa, during the last twenty years. In 1933, the Brookings Institution of Washington, D.C., under the auspices of the Committee on Reduction of Governmental Expenditures, made a comprehensive study of the government of Iowa and on the basis of their findings prepared a lengthy report entitled Survey of Administration in Iowa. Again in 1950, the Iowa Governmental Reorganization Commission conducted a similar study and issued a report based on their findings.

Both investigations had for their end purpose the making of recommendations that would aid the legislature in reorganizing the state government in such a manner as to obtain more efficiency and economy in its operation. However, though the purposes were similar, the type of reorganization advocated by each was different.

The Brookings report favored the fiscal-control type of reorganization whereby fiscal administration and vital staff agencies were made directly responsible to the Governor. With such key functions and agencies in the hands of the Governor, it was felt that all other administrative agencies would then automatically become responsible to the Governor.

Though the Report of the Iowa Governmental Reorganization Commissioners' also favored a strong Governor, they advocated the partially integrated type of reorganization. Under this plan the constitutional offices would remain but the statutory offices would be consolidated into fourteen agencies, each headed by a single executive appointed by the Governor with the consent of the Senate.

Upon comparing the two plans it is found that they both favor having a strong Governor and reducing administrative agencies by means of consolidation based on a functional distribution of duties. The main area of disagreement arises in the location of agencies concerned with fiscal administration and the use of boards and commissions.

While it is a basic tenet of the Brookings plan to have the fiscal-control functions in agencies directly responsible to the Governor, the Iowa Governmental Reorganization Commissioners would divide such fiscal functions between the State Comptroller, Auditor and Treasurer, as well as having a legislative Budget and Financial Control Committee with authority to advise the Governor on budgetary affairs and to keep a running account on all fiscal matters. The end result of such a plan would be the placing of fiscal-control functions in the hands of the legislature.

The use of boards and commissions to head administrative agencies would not have been in the area of disagreement had the Iowa Governmental Reorganization Commissioners put into practice their own principle: that quasi-legislative and quasi-judicial functions should be handled by plural bodies.

A study of the legislation passed from the convening of the Forty-fifth General Assembly in 1933, to the adjournment of the Fifty-second General Assembly in 1947, reveals that less than fifty per cent of the major recommendations proposed in the Brookings report were acted upon. During this span of fourteen years, six major pieces of legislation concerned with reorganization were passed: (1) The Budget and Fiscal Control Act; (2) The establishment of the Highway Safety Partol; (3) The creation of the Conservation Commission; (4) The creation of the State Department of Social Welfare; (5) The creation of the State Department of Public Safety and (6) The establishment of the State Tax Commission.

It is too early to determine the full effect of the Report of the Iowa Governmental Reorganization Commission upon the actions of the legislature, as only the Fifty-fourth General Assembly has met since the report was made. However, during this one session of the legislature thirteen reorganization bills, based on the report, were introduced, and two were passed. These two provided for: (1) The establishment of the Budget and Financial Control Committee and (2) The Fiscal Management and Personnel Director Act. This last Act did not make the sweeping changes advocated by the reorganization committee.

After a study of the reorganization movement in Iowa of the past twenty years, it can be concluded that this movement has had its effect on the organization and operation of the state government. With the increasing tax rates more pressure will be placed upon state legislators to further reorganize in order to bring about more economy and efficiency in the operation of the state government. For the advocates of reorganization the movement is painfully slow, however, by its very nature it is evolutionary and therefore will continue to progress as changes in the times and conditions warrant.

Microfilm copy of complete manuscript of 283 pages, \$3.54. Enlargements 6" x 8", 10¢ per page.

**THE MISSOURI BASIN'S PICK-SLOAN PLAN:
A CASE STUDY IN
CONGRESSIONAL POLICY DETERMINATION**

(Publication No. 4011)

Marian Elizabeth Ridgeway, Ph.D.
University of Illinois, 1952

With the 1944 Flood Control Act and the 1945 Rivers and Harbors Act, the U.S. Congress established a river-developmental scheme for the Missouri Basin which became known, while being legislated, as the "Pick-Sloan Plan." Growing out of two separate Federal administrative agency proposals for treatment of the River and its tributaries, the Plan resulted from a compromise of contending Federal administrative agencies, and called for extensive Federal Government engineering work and construction along the rivers of the nine states of

the Missouri Basin. It included provisions for flood-control, a nine-foot navigation channel on the Missouri River, irrigation and reclamation, supplementation of existing municipal water supplies in certain areas, and increased public hydroelectric power production. A policy new to Federal water law, requiring participation of Basin states in planning and consultative stages of project formulation, was established to the end that the states were vested with a limited "veto power" over Federal activities on River matters within the Basin. The continuing validity of existing state water laws was recognized; water "rights" previously established under such laws were allowed to continue; and the priority of waters west of the ninety-eighth meridian for beneficial, consumptive uses over the water needs for navigational purposes in the lower Basin was officially declared. Enacted over counter-proposals for a Missouri Valley Authority and a Missouri River Commission, the Pick-Sloan Plan established a system of divided administration and cumbersome State-Federal inter-governmental relationships.

Conceived in a controversy developed in two main arenas, — the Basin and Washington, D.C., — the established policies emerged from conflicting demands of various group interests concerned with water usages. The legislation and the legislative activity attending it provided excellent material for study of policy-formulation processes in the United States today.

The writer's problem was to discover and describe the legislative process, seeking to identify and define the groups operative in the situation, examine and portray their behavioral patterns and their relationships, and determine the significance of their activities in formulation of the policies which the Congress came to adopt. The role and function of the U.S. Congress, seen as one of the participating groups, was found to be that of the official and legally-restrained policy-determining body, but an agency operating also within a framework of certain extra-legal relationships with non-governmental groupings, to the end that it emerged as a representative device for particular group interests of the electorate.

Other actors important to the determination of policy were seen to be certain administrative agencies, the Chief Executive, the states, private organizations, local governments, the press, and a few individuals. The emergent intricate pattern of interrelationships and transactional behavior displayed a process favorable to certain strategically-powerful groupings enjoying attributes of strength, permanence, and established affiliations made more effective through combination by means of "inter-locking directorates." The nature of the problem of representation of the electorate was given particular clarity.

The writer's method was almost wholly historical in approach, utilizing public records and other available recorded data as source material. To provide understanding of the over-all nature of policy-formulation, the historical background of this legislation was presented; the Basin's particular natural, economic, social, and political problems were outlined; and the events which provided impetus for the present

legislation were described. Events subsequent to the 1944 and 1945 legislation, seen as bearing implications for future policy additions or changes, were briefly treated.

Microfilm copy of complete manuscript of 475 pages, \$5.94. Enlargements 6" x 8", 10¢ per page.

THE EFFECT OF THE COLD WAR UPON THE OCCUPATION OF JAPAN

(Publication No. 4012)

John Richard Scott, Ph.D.
University of Illinois, 1952

This is a study of the effect of Great Power politics upon the Occupation of Japan. The events of international relations of the period since 1945 have resulted in shifts in power alignments. A recent ally has become the enemy of the Western powers. A former enemy has become an ally. The seeming paradox has emerged not as the result of principle but rather as a product of the shift in the power relationships.

The first part of the study is devoted to the background and the relationships of the powers before the Occupation of Japan began. Prior to the war the Great Powers failed to take steps to cooperate among themselves to solve the problems of the Far East, or to stop the "aggressor" states. During the war, although there were efforts to collaborate for a just peace, the predominant fact was the hedging by the powers to maintain their own individual interests.

With the "unconditional" surrender of Japan there arose the conflict over the control of the Occupation. The United States secured, to all purposes, the complete control of the Occupation, despite the fact that two international organs, the Allied Council and the Far Eastern Commission, were set up, ostensibly, for the purpose of controlling the Occupation. The handling of the Occupation on a unilateral basis contributed little to the creation of faith in international cooperation.

The original policies for Japan emphasized reform on the social, economic and political fronts. As the cold war developed, the emphasis shifted to one of recovery. This policy change proved favorable to the conservative elements in Japan. In the process of making Japan the "bulwark against Communism" and the "workshop of Asia," those advocating reform, whether Communist or non-Communist, were lumped together as "threats to the Occupation and the Japanese Government."

The Allies were watching the progress of the Occupation with keen interest. There was continuous opposition and criticism of the unilateral approach to the Occupation, and to the failure to carry out thorough reform. The criticisms covered the entire range of the Occupation's procedures and policies. Criticisms often were based upon purely nationalistic considerations.

The latter part of the study deals with the

problems associated with the negotiation, signing, and ratifying of the Peace Treaty, together with the Security Treaties signed at the time of the San Francisco Conference in September 1951. The division of the world into two camps prevented agreement on a draft treaty. Under the conditions of cold war, neither side could stand by and see the other attach Japan to its system without remonstrance. Since the Communists of the Soviet Union and China were on the outside looking in, they could do nothing more than hurl charges of "colonialism" and "imperialism" in an effort to sway the minds of the Asiatic peoples who had so long sought to escape the yoke of the imperialist powers. In the end, a separate treaty, without the Soviet Union and Communist China, was signed by forty-eight nations. Japan, upon ratification, would be a "sovereign, independent nation," with foreign troops based on her home islands to protect her. Many can not see how she can be considered either sovereign or independent. She is caught in the middle of the cold war. Neither side will let her be neutral. She must decide which way to go. Whatever the ultimate decision, there will not be any moral qualms on her part. The struggle for power knows no moral scruples.

Microfilm copy of complete manuscript of 368 pages, \$4.60. Enlargements 6" x 8", 10¢ per page.

THE NEWSPAPER IN THE ONE-DAILY CITY AS A CARRIER OF COMMUNITY OPINION

(Publication No. 4109)

Samuel Stubbs Talbert, Ph.D.
State University of Iowa, 1952

This study attempts to answer three major questions related to the problem of concentration of newspaper publishing in the United States:

(1) Does the editor of the non-competitive daily newspaper recognize any special responsibility to make his newspaper available to all voices in the community?

(2) In practice, how available is the non-competitive daily newspaper as a forum for diverse opinions in the community?

(3) To what extent does the public actually use the daily newspaper as a forum for public affairs?

Findings of the study are based primarily on questionnaires returned from 216 editors of daily newspapers. Supplementary information was obtained from content analysis of 224 different newspapers and from personal interviews with editors.

All editors questioned print letters from readers. Comment of editors and readership research indicate that letters to the editor are among the most popular features a newspaper can print. However, the editors noted a lack of inclination on the part of individuals to express themselves through the newspaper's forum.

It was found that letters dealing with racial and religious controversy would be excluded from publication by more editors than letters dealing with any

other subject. The most readily acceptable subject matter for letters would be discussion of national and local political issues. Criticism of American institutions and ideology would be restricted by an increasing number of editors as the criticism increasingly deviated from popularly held views. There would be practically no bar on debate within the traditional two party American political scheme.

Even the most controversial of local issues does not appear to stimulate a great number of letters from readers. The mean number of letters received by monodailies on the one most controversial local issue over a period of six months was thirty-one; the median was fifteen. A very low correlation existed between newspaper size and the number of letters received on a local issue.

President Truman's relief of General MacArthur from his Far East commands in the Spring of 1951 brought a negligible number of letters to monodaily newspapers. Forty per cent of 168 respondent editors received no letters on the MacArthur controversy. Letters per subscriber on a violent national issue increased with increased circulation.

Monodaily editors expressed a vigorous and virtually unanimous opinion that the monodaily newspaper has a special responsibility to give outlet to all voices in the community.

Microfilm copy of complete manuscript of 387 pages, \$4.84. Enlargements 6" x 8", 10¢ per page.

THE BOXER CATASTROPHE

(Publication No. 4241)

Chun-lin Tan, Ph.D.
Columbia University, 1952

The Boxer bands were not local militia recruited in response to Imperial decrees. They were initially organizations of the common people with the purpose of fighting the native Christians. Under the spur of the secret societies they soon became a popular anti-foreign front spreading from Shantung to Chihli. Partly because of the weak character of Viceroy Yu Lu and partly because of pressure from Peking, which was more effectively brought to bear upon the province in which the Capital lay, the Boxer movement was not stopped in Chihli at the early stage as it was in Shantung by Yuan Shihk'ai.

The reactionaries under the leadership of Prince Tuan and Kang I opposed the suppression of the Boxers, and the Empress Dowager fell in with them. But if the Imperial Court was determined not to suppress the Boxers, it was only after the Allied expedition under Admiral Seymour had left Tientsin for Peking on June 10, 1900, that it was prepared for war.

It is evident that Jung Lu was opposed to the Boxers and the war. A minister, however, had to obey Imperial orders, and Jung Lu was loyal to the Empress Dowager. His troops participated in the attack on the Legations, but he realized that to avert

the national calamity the foreign Ministers had to be saved. He played a leading part in arranging the truce and the negotiations for the escort of the foreign Ministers to Tientsin. The Chinese proposal to escort the foreign envoys out of Peking was a sincere one.

The contributions of the Southern Viceroy in keeping more than half of China from war can hardly be exaggerated. But while the success is justly attributed to Liu K'un-i and Chang Chih-tung, the contributions of Sheng Hsuan-huai have not been sufficiently noted. As Director of Telegraphs Sheng was best informed. His resourceful mind was a motivating force in many of the measures taken by the Southern Viceroy.

The activities of the Southern Viceroy were not confined to the Southern provinces: they worked hard to resolve the general situation. Never in the annals of the Ch'ing Dynasty had the provincial officials played such an active part in the shaping of the nation's foreign policy.

Credit must go to Li Hung-chang for concluding the peace with the Powers. Although he tarried, and that not without reasons, to go up to the North, he lost no time in applying himself to resolving the situation. No other person showed greater courage than Li in advising against the Court's wishes. To oppose what was impossible and to accept what was inevitable was his guiding principle in the peace negotiations. Had it not been for the determination of Li Hung-chang in urging the acceptance of the foreign demands, it would have taken much more time for the undecided Court to make up its mind.

The Tseng-Alexeieff Agreement was signed without the Court's knowledge. The text printed in William W. Rockhill, Treaties and Conventions with or concerning China and John V.A. MacMurray, Treaties and Conventions with and concerning China is a wrong one.

In the Manchurian crisis Li Hung-chang's persistent advice that the amended Russian Agreement be signed was opposed by almost all high officials of China. The Imperial Court, undecided and wavering, had for some time practically passed on to Yang Ju the responsibility of making the decision. It was the insistence of Yang Ju that he could not sign without the express order from the Court that saved China from signing away its rights over Manchuria and helped create a situation, where under the pressure of Japan and Britain, Russia at last decided to abandon the Agreement.

Microfilm copy of complete manuscript of 384 pages, \$4.80. Enlargements 6" x 8", 10¢ per page.

DUTCH FOREIGN POLICY TOWARD GERMANY, 1933-1939

(Publication No. 4246)

Elisabeth S. L. van Dyke, Ph.D.
Columbia University, 1952

The traditional foreign policy of the Netherlands was founded on the principle of complete detachment

from all foreign entanglements. During most of the 19th century, the Netherlands remained aloof to the political affairs which occupied Europe. At the conclusion of World War I, the Dutch adopted a more active foreign policy through their membership in the League of Nations. However, as the Netherlands consistently maintained that membership in the League had not supplanted their position of neutrality, Dutch foreign policy in the post-war period up to 1933 differed only slightly from their pre-war passive policy. The Netherlands was more a spectator than a participant in League affairs. The difference in their foreign policy was one of degree rather than principle.

The greatest event which influenced Dutch foreign policy in the inter-war period was the advent of the National Socialist Government in Germany in January, 1933. The rise of National Socialism also produced a change in the internal political affairs of Holland. As the Hitler Government came into power, what had been considered an inconsequential political party in Holland became a grave danger as the Dutch National Socialist party (NSB) assumed sizable dimensions. By the end of 1933, exactly two years after it had been founded, the NSB had been included on the list of government-designated revolutionary parties which under Dutch law were forbidden to civil servants and the military. In the provincial elections of 1935, the NSB made heavy gains as they polled 8% of the vote and received 44 seats in the Provincial States and 2 seats in the Upper House of the National Parliament. However, as the international situation became aggravated in the following years, the NSB lost much of its support and it made a poor showing in the elections of 1937 and 1939.

From 1933 to 1939, Dutch foreign policy was based mainly on the non-provocation of Germany and the return to the fundamental principle of neutrality, independence and detachment. The Netherlands had been overwhelmed by the economic crisis and, as a trading nation, had tried to recapture their foreign markets. As Germany was an important market for Dutch trade, the Netherlands desired above all to avoid all provocation of the Reich which might result in the imposition of retaliatory economic measures. As Germany began a policy of interfering in the internal affairs of surrounding countries, the Dutch desired to give to no pretext to the Germans to interfere in Holland. The main desire of the Netherlands was to stay out of trouble and any policy leading to that end was acceptable to them.

In the beginning, the Dutch had placed their faith in the collective security of the League of Nations. However, as Germany, and later Japan and Italy, withdrew from the League, the Dutch saw the organization more as a political alliance of a small amount of states rather than a league of all states. The Dutch feared that League membership would cause them to participate in action which would provoke the Third Reich. Together with the other small states of Europe, they declared through the Communiqués of 1936 and 1938, after the failure of the League in the Ethiopian affair and the inactivity of the League in the Austrian crisis, that they were to

be considered virtually free from the collective obligations of Article 16. They also re-established the principle of territorial inviolability. The Dutch refused the German offer to guarantee their neutrality, which they considered axiomatic. They also refused to conduct even the most informal discussions with the British and French of their position in the case of war. When war came, they pursued a policy of neutrality with such devotion that an infringement by either belligerent would have forced the Netherlands to join the opposite side.

The Netherlands saw themselves as a small state surrounded by great powers involved in endless intrigue and felt that the best defense against all possible attack was to withdraw from participation in the international scene and assume the role of detachment, neutrality and independence.

Microfilm copy of complete manuscript of 293 pages, \$3.66. Enlargements 6" x 8", 10¢ per page.

LAND REFORM IN THE PEOPLE'S REPUBLIC OF CHINA

(Publication No. 4113)

Te-Hua Wang, Ph.D.
State University of Iowa, 1952

Land reform in the People's Republic of China is an important domestic program having both economic and political implications. The outcome of the reform will decidedly affect the economic and, to a lesser extent, the political development of China. It will probably also have an influence in other countries facing similar agricultural problems.

The present program in China, according to the 1950 Agrarian Reform Law, calls for a redistribution of land among private owners, with collectivization envisaged whenever the stage of "New Democracy" is superseded by the stage of socialism. The main declared purpose of the reform is to increase agricultural productivity. Political purposes are served also, for the reform program involves the confiscation of the rural property of landlords and a denial of any benefits to "reactionaries" regardless of their class status.

Because the land reform program affects different groups of peasants differently, standards used in determining their "class status" become significant. The standards are based on Communist theory, and they lead to the classification of rural people as: landlords, rich peasants, middle peasants, poor peasants, and rural workers. Rural property of landlords is simply expropriated. Rich peasants in general retain their property, though under certain conditions a portion of their land may be taken. With some exceptions, land confiscated is available for distribution to poor peasants, rural workers (landless peasants), and dispossessed landlords, who as a rule get equal shares. The law forbids encroachment on the property of the middle peasants, but they

also acquire no land. Those who lose are not compensated, and those who gain land get it free.

Although the ultimate goal of the People's Republic of China is a collectivization of agriculture, private ownership is protected after land reform. Along with private ownership, inequality of land holdings exists.

The basic unit for carrying out land reform is a *hsiang*, which embraces several villages; the executive organization is the peasants' association. Government cadres together with local "positive" peasants assume the initiative and leadership in the execution of the reform. Appeals from local decisions of "class status" and the cases of those who oppose land reform or violate the land reform law are heard by the people's tribunals, which are special and temporary judicial agencies.

Post-reform policy involves governmental measures to bring about the organization of rural cooperatives and of mutual aid teams. The purpose of these measures, in the short run, is to contribute to an increase in agricultural production; in the long run it is expected that they will facilitate the ultimate collectivization program.

Microfilm copy of complete manuscript of 228 pages, \$2.85. Enlargements 6" x 8", 10¢ per page.

SOCIOLOGY

THE DYNAMICS OF BUREAUCRATIC STRUCTURE: A STUDY OF INTERPERSONAL RELATIONS IN TWO GOVERNMENT AGENCIES

(Publication No. 4159)

Peter Michael Blau, Ph.D.
Columbia University, 1952

Statistical records of performance were mechanisms of bureaucratic control in the observed departments of a state employment agency and a federal agency of law enforcement. Evaluation on the basis of quantitative indices constrained operating officials to attempt to accomplish predetermined results by certain methods. This control device was more effective than rules, which tended to be modified in the course of operations, and it improved the relations between superior and subordinates by obviating his need for influencing operations through frequent commands and close supervision, the kind of control officials resented. An unanticipated function of these records was the reduction of bias in the treatment of clients. The more extensively they were used for evaluation, the less likely were officials to treat white clients preferentially.

This method of evaluation encouraged competition between officials. In the employment agency, where the performance of interviewers depended on the job openings available in a common pool, competitive tendencies to monopolize these job openings

interfered with operating efficiency, as indicated by the lower productivity of the more competitive of two similar sections. The cooperative norms that discouraged competitive practices in one group contributed to efficiency as well as to work satisfaction. Recurrent conflicts with clients created tensions, which interviewers often released by complaining or joking about troublesome clients in conversation with colleagues, another unofficial practice that was beneficial for operations.

Friendly relations between officials in the federal agency also helped to resolve the nervous strains that arose in complex negotiations with clients. Moreover, their informal associations reduced their anxieties over decision making, engendered by evaluation on the basis of the accuracy of the decisions made in investigations. The officially prohibited practice of consulting colleagues largely destroyed this anxiety, and thus restored the ability of agents to perform their duties effectively, even in cases when they did not consult a co-worker. This cooperative practice generated social cohesion, but also differentiation of unofficial status. The more competent agents, unless they were uncooperative, became highly respected and well integrated members of the departmental group. The relatively less competent agents tended to exercise more social initiative to extend their informal relations with colleagues. The respect and acceptance of co-workers facilitated the work of an agent, and were valued by him in their own right. This enabled the group to enforce its unofficial norms, since it made agents responsive to signs of disrespect and threats of ostracism from others. Even unofficial norms that contradicted official rules often improved operating efficiency. The taboo on reporting offers of bribes for prosecution, for example, enabled agents to exploit the advantageous position into which the rejection of such an offer had put them in negotiations with clients, thus increasing their chances to attain the objectives of the organization.

The periodic civil service rating, which influenced their opportunities for advancement, made subordinates dependent on their superior. This constrained them voluntarily to accept his decisions as the governing influence in many of their bureaucratic activities. The effective authority of the superior often made direct control of subordinates unnecessary, because it motivated them to develop unofficial practices in response to organizational needs for removing obstacles to efficient operations. Emergent unofficial practices as well as newly instituted official procedures continually modified the structure. Operating difficulties that persisted, and the interest of these officials in the continued existence and possible expansion of their agency, induced them to favor many new policies, contrary to the assumption of the inevitable resistance to change among bureaucrats.

Microfilm copy of complete manuscript of 481 pages, \$6.01. Enlargements 6" x 8", 10¢ per page.

THE NEWSPAPERMAN, NEWS AND SOCIETY

(Publication No. 4163)

Warren Breed, Ph.D.
Columbia University, 1952

The problem takes the form of the question, "Who or what determines what goes into the middle-sized daily newspaper?" The subject, therefore, is the control of the press, not its content, audience, or effects, or the performance of the press.

After introductory remarks about the function of the press, and a discussion of relative bias in the news, previous researches are examined. The present study is discussed under four major areas of control determinants: societal background of the United States press, newsroom controls, professional norms and community factors influencing press content.

The values, norms and stratification systems of American society are examined as societal determinants of newspaper content, and the example given is the treatment of labor news.

The second major area gives a detailed presentation of institutionalized statuses in the newsroom, with the publisher seen as having ultimate control, and editors and staff members as performing the actual tasks of production. The basic hypothesis maintains that the staffer "senses" his publisher's policy, thus anticipating his wishes and conforming to policy, without being commanded to do so. The staffer becomes socialized to the newsroom in three stages: cub, wiring-in, and veteran stages. Seven types of staffers are singled out, with respect to their relationship with the publisher and his policy. In certain specific conditions, the staffer may innovate, or bypass policy.

The third area of controls takes up the professional norms and activities surrounding the newspaperman's work. In discovering what the newsman does in producing the paper, certain control factors emerge. Such factors are: the influence of larger papers upon smaller ones; the pooling of news between reporters for ostensibly competing papers; the influence of news style upon content; the nature of news, and the conflict between "interesting" as against "serious" or "important" news; the complexity of "serious" news and the difficulty for the newsman, working at top speed, to understand the complex and subtle nature of the phenomena he covers; the traditional nature of newspapering, and kinds of events which are not regarded as being newsworthy; routines followed by the newsman; and socio-psychological factors such as pride in the job, seeing news as a cardinal value, and the deference accorded newsmen.

The fourth and final area of control stems from the relationship between the newspaper and the community. Outside pressures on the paper are examined, and the influence of the beat and the source are discussed. A case history of a deviant paper is presented, in which this skeptical, aggressive paper is punished for its theoretically democratic

functioning. The press is seen as being a "magic mirror," in many ways giving the community a picture of what it wants, rather than what it is.

In conclusion, sixteen functions of the press are suggested, and fourteen major control factors listed.

Data were gathered by observing newsmen at work and conducting 107 intensive interviews with publishers, editors and reporters representing some twenty middle-sized papers (circulation range between 10,000 and 100,000). The report also draws on many conversations with newsmen and others interested in the press, on published works, and on the author's experience as a reporter.

Microfilm copy of complete manuscript of 472 pages, \$5.90. Enlargements 6" x 8", 10¢ per page.

THE INFLUENCE OF THE COMMUNITY AND THE PRIMARY GROUP ON THE REACTION OF SOUTHERN NEGROES TO SYPHILIS

(Publication No. 4164)

Robert Oscar Carlson, Ph.D.
Columbia University, 1952

This is a sociological study of people's responses to syphilitic symptoms on their bodies. Its data consist of five hundred interviews with Negroes who were receiving treatment for primary or secondary syphilis in venereal disease hospitals in Mississippi. The primary purpose of this study is to provide a sociological analysis of factors which cause some persons with early syphilis to secure medical care and which cause other persons with similar infections to refrain from receiving adequate treatment for their infections.

In this study we analyze four popular explanations for the failure of venereally infected individuals to seek adequate medical care. The first explanation is couched in terms of the unfavorable social sentiments thought to be associated with a venereal disease infection. The second suggests that the infected individual may have had previous unfavorable experiences with doctors or public clinics. The third states that people who avoid diagnosis of a syphilitic infection have inadequate information about these diseases. And the fourth holds that some infected persons simply are unable to notice venereal disease symptoms on their bodies. All four of these explanations have some degree of logical plausibility. However, as they were put to empirical test in this study, each proved to be inadequate. Although each of the four theories provided a satisfactory ad hoc explanation for some cases of nonvolunteering, none supplied a general theory which could account for volunteering and nonvolunteering among individuals differing widely in their social characteristics and prediagnostic experiences.

The evaluation of these several widespread explanations of nonvolunteering was followed by a series of comparisons between volunteers and nonvolunteers, in which certain critical variables were controlled. These comparisons provided an inventory of

characteristics and attitudes in terms of which volunteers and nonvolunteers differed significantly, and thus supplied the raw material from which we fashioned a new hypothesis for the better understanding of the nonvolunteer. The most striking fact in these new data was the completely different orientation adopted by volunteers and nonvolunteers toward the customary manner of solving personal problems. Nonvolunteers looked to their families or to persons within their primary groups for help. Volunteers largely neglected these sources of advice and turned instead to governmental or private health and welfare agencies for help.

We established that volunteers tend to be members of social groups with a low level of social cohesion and that nonvolunteers are more often members of groups with a high level of social cohesion. This finding has relevance for sociological theory for it brings out a fact not considered by Durkheim's classic study of social cohesion, *Le Suicide*, that a high degree of group cohesion may be functional in one social setting and dysfunctional in another. With respect to suicide, a high level of social cohesion serves a positive social function by militating against high rates of suicide. In the present case, a high level of social cohesion is dysfunctional from the standpoint of the community at large. It lessens the probability that individuals will seek professional medical diagnosis of their infectious syphilis, thereby posing a threat to the health of the entire community.

Much of the ensuing discussion in this study deals with the part which the several media of communication played in influencing the prediagnostic behavior of men and women in this study. We concluded that formal instruction about the venereal diseases has limited success in influencing persons with infectious syphilis to seek medical diagnosis. On the other hand, we found evidence that informal, person-to-person advice about a syphilitic infection increases people's information about these diseases and shapes their attitudes toward them. Finally, we reported evidence that the attitude and the morale of the venereal disease control workers, themselves, affects the success of their case-finding and educational programs.

Microfilm copy of complete manuscript of 361 pages, \$4.51. Enlargements 6" x 8", 10¢ per page.

THE ROLE OF THE FAMILY IN CULTURALLY PATTERNED URBAN WHITE MALE JUVENILE DELINQUENCY: SOCIOLOGICAL AND PSYCHIATRIC CONTRIBUTIONS

(Publication No. 4183)

Nathan Lewis Gerrard, Ph.D.
Columbia University, 1952

The Subject Matter

The slum boy who grows up to become a professional criminal because his contacts with law-breaking groups since early childhood are more intimate

and frequent than his contacts with conventional groups (differential association.)

The Problem

Although there is formal agreement that the scientific analysis of delinquency requires the collaborative efforts of both disciplines, the sociologists and psychiatrists have tended to disparage the others' contributions.

Purpose

In the hope of bringing the two natural allies closer together, the dissertation will attempt to show: (a) that each discipline addresses itself to different kinds of problems, the sociologists to the problem of sociological selection (rates) and the psychiatrists to the problem of psychological selection (incidence); (b) that the contributions of each discipline are complementary and supplementary rather than contradictory.

Contributions of the Sociologists

High rates of habitual delinquency in urban slums are explained in terms of the homogeneity of the cultural goals prescribed for the social statuses variously situated in the social structure. In contrast to other culture and social structures (e.g. feudalism) where the children of the lower class win status in the community by pursuing cultural goals standardized for their class and are socialized by their parents accordingly, the children of the lower classes in our open class society are called upon when they participate in conventional agencies outside the home to pursue middle class goals and exhibit middle class virtues. The role of the family in the socialization process thus becomes complicated and difficult where the later members of the family are expected to occupy higher positions in the social structure than its initial members.

Contributions of the Psychiatrists

The sociologists, however, do not explain why, of the theoretically possible alternative modes of adaptation for slum children who are handicapped by inadequate family training in the competition for status in conventional institutions staffed by middle class surrogates of the larger society, only a small minority, even in those groups where the structural pressures toward non-conformist behavior are greatest, persistently elects to form and participate in predatory and deviant sub-groups which apply criteria of status that tend to be the reverse of those applied by conventional society. The psychiatrists, however, have thrown light upon the problem of psychological selection through the conception of the emotionally independent antisocial personality (EIAP) and by indicating the kinds of child-rearing practices likely to produce such a type of personality. The EIAP is defined as a personality with a generalized unwillingness to cooperate with others. The generalized unwillingness to cooperate is due to the persistent feeling that others are hostile or indifferent to one's welfare. Because of this feeling, the EIAP has little capacity for sympathetic identification and little

anxiety that his uncooperative (hostile) behavior is forfeiting the affection and good will of others. The EIAP formation is pronounced where it is accompanied by strong inferiority feelings with regard to socially useful activities. There is a strong congeniality between the key traits of the EIAP and the key traits of the delinquency culture pattern. The concept of the EIAP does not imply a special psychology of delinquency. There are quantitative variations in the strength of the EIAP which can be fitted into a continuum encompassing the most socialized as well as the least socialized personality. The sociological contributions, moreover, help us explain why the antisocial behavior of the EIAP is more likely to be culturally-patterned and law-breaking than idiosyncratic as in the case of the EIAP reared in a middle class family.

Conclusion

The psychiatric contributions throw light upon distinctly sociological problems, and conversely, the contributions of the sociologists throw light upon distinctly psychiatric problems. Plausibility is added to the assertion that the contributions of the psychiatrists and sociologists are complementary and supplementary by an attempt to show that the child-rearing practices indicated by the psychiatrists as likely to foster the development of the EIAP are more likely to be found in the slums than in the residential communities of the middle classes.

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PARTICIPATION BIAS AND RE-INTERVIEW EFFECT IN PANEL STUDIES

(Publication No. 4185)

Charles Young Glock, Ph.D.
Columbia University, 1952

The panel technique gives promise of being an important new tool for the study of social process or change. The method involves repeated interviews with the same individuals at different points in time. Individuals who change in their attitudes or behavior from one interview to the next can be identified and reasons for change sought. The method is most applicable to the study of short-term change in individual or group behavior.

Among the many methodological lines along which the social sciences are developing, the panel method seems to be one of the most promising for obtaining a more complete understanding of social change of a short term nature. The more widespread adoption of the technique is limited by the fact that two operational difficulties arising from its use have still to be overcome.

The first of these may be identified as the participation problem. In the process of recruiting panel membership, there arises the danger of a

participation bias because some of the candidates designated as panel members by the sample design either refuse to participate or cannot be located. If these people differ in any important respect from those who become panel members, the results obtained from the panel members alone are unlikely to be representative of the universe which the panel is intended to sample. Furthermore, there is the possibility that once its members have been recruited, some will fail to participate in all of the required interviews.

A second operational problem relates to the effect of repeated interviewing on panel responses. Repeated interviewing itself may make the panel unrepresentative over time by causing its members to focus more than a "normal" amount on the topic covered in the study.

The present study focusses attention on these two operational problems in the administration of panel studies. The first is studied through the secondary analysis of data collected from a total of 16 studies using the panel technique. The second is studied through the analysis of two experimental panel studies.

With respect to the participation problem, the results show that the kinds of individuals who become panel members and who participate continuously have different characteristics from those who fail to become panel members or becoming members, fail to participate continuously. Furthermore, the results show that the former kinds of individuals exhibit different attitudes, opinions, and behavior towards and in respect to the panel topic than the latter groups and that these differences are not accounted for by variations in the sex, age, education, and family size composition of these groups. The results underscore the importance of recruiting all candidates so designated by the sample as panel members and of securing their continuous participation in responding to all panel interviews.

With respect to the problem of re-interview effect, the results show no evidence of a re-interview effect on level of interest in amount of exposure to information about, or level of knowledge of the panel topic. They do show evidence of a re-interview effect on consistency of response to related questions asked in a given interview, but no evidence of a re-interview effect on consistency of response to the same question asked repeatedly from one interview to the next. Clear evidence from one study shows that re-interviewing influences the panel to resolve controversial issues and to do so more quickly than the population it is intended to sample. These results confirm the general hypothesis that reinterviewing affects panel responses. However, they also underscore the importance of specifying the conditions under which the effect is manifested.

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AN OPERATIONAL METHOD FOR MEASURING MEDICAL NEEDS AND RESOURCES IN RURAL COMMUNITIES

(Publication No. 4026)

Linwood L. Hodgdon, Ph.D.
Michigan State College, 1952

Few social problems in recent years have aroused greater interest and concern on the part of the general public than that of obtaining adequate medical care. Since all social problems have "social" causation, the so-called "value" approach¹ to the study of social problems is employed in the early stages of the dissertation to point out the dual role of conflicting values both in creating the problem and retarding its solution. In other words, social problems are relative; they are defined in terms of the values which people hold with regard to them, and the inability of people in a given group to reach a consensus of opinion.

A major role of social research, when viewed from the "value" approach, lies in demonstrating whether a certain condition which is believed to be a problem exists, and to what extent. The primary objective of this dissertation, therefore, is the development of an operational method to quantitatively measure both the need for medical care and the resources available to meet these measured needs in rural communities.

The introduction into sociology of the operational point of view developed in physics has been vigorously urged by Dodd² and Lundberg³ as well as others. Operationalism stresses two things; the definition of concepts not in terms of metaphysically conceived "properties", but rather in terms of observable physical operations, and the probability of occurrence. In other words, social phenomena should be defined both in terms of the probability of occurrences, and in terms of socially meaningful, verifiable operations. All concepts and definitions in this dissertation employ this method.

The three basic components of the operational method include (1) the natural area concept, (2) measuring physician resources, and (3) measuring the need for medical care. The development of each of these components, and the function of each, is described in detail. The over-all method is then tested in two communities in Michigan.

It has been popularly assumed by physicians and laymen that one physician for each 1,000 population was "adequate" medical personnel for any given area. A basic hypothesis of the author is that this traditional method of determining medical needs and resources is invalid since it assumes that both needs and resources are constants, whereas recent research indicates that both are variables.

Evidence in support of the latter hypothesis, made possible by data obtained in the state wide Michigan Health Survey, appears throughout the dissertation. The two community case studies in which the operational method was employed also tend to support the hypothesis that medical needs

and resources vary, and that the traditional method of determining medical "adequacy" is invalid.

A detailed consideration of the margins of error involved in the over-all method is not possible at the present time. This conclusion is based upon the fact that each component of the operational method is subject to sampling and other types of errors, the variation of which in some instances is not known. The determination of the validity of the operational method is contingent upon further refinement of techniques and procedures indicated in the dissertation, and the determination of their respective margins of error.

In conclusion, the use of the operational method has proved valuable as a basis for scientific social planning in the field of health and medical care, and with further refinement may make additional theoretical and practical contributions.

¹Fuller, Richard C., and Myers, Richard R., "Some Aspects of a Theory of Social Problems," *Am. Soc. Rev.*, Vol. VI (Feb., 1941), pp. 24-32.

²Dodd, Stuart C., "A System of Operationally Defined Concepts for Sociology," *Am. Soc. Rev.*, Vol. 4 (Oct., 1939), p. 619.

³Lundberg, G. A., "Operational Definitions in the Social Sciences," *The Amer. Jour. of Soc.*, Vol. 47 (March, 1942), pp. 727-745.

Microfilm copy of complete manuscript of 178 pages, \$2.23. Enlargements 6" x 8", 10¢ per page.

A COURT FOR CHILDREN: A STUDY OF THE NEW YORK CITY CHILDREN'S COURT

(Publication No. 4201)

Alfred Joseph Kahn, D.S.W.
Columbia University, 1952

Although in itself complete, "A Court for Children" is part of a broader evaluation of existing services for children in trouble in New York City and, as such, is the expression of an attempt to develop a rational and integrated plan. Earlier results of this endeavor have been described in two previous studies published by the Citizens' Committee on Children of New York City, Inc. (*Children Absent from School*, 1949, and *Police and Children*, 1951) and additional reports are projected. The present effort seeks primarily to appraise the activity of Children's Court in adjudication, disposition-planning and probation and to develop recommendations for strengthening the operations for which judges and probation officers are primarily responsible. Attention is, however, also devoted to aspects of administration, facilities, community relationships and resources on which the Court must call.

In a broader sense, "A Court for Children" is a study which demonstrates an approach to planning child welfare services in which client needs and

technical knowledge about the helping process are given precedence over definitions of agency specialization based on outmoded understanding of children's problems or of treatment methods. It also seeks to illustrate a methodology for evaluating professional practice in a social welfare agency.

The study was carried through by: (a) devising a basic yardstick, expressed in the form of detailed criteria, by which practice in the Children's Court of the New York City Domestic Relations Court was to be examined; (b) examining a cross-section of activity in the light of that yardstick; (c) evaluating the results of the examination and seeking to explain it with reference to the history, social setting, staff qualifications, orientation and resources of the Court; (d) discussing alternate proposals for the basic role of Children's Court and suggesting the kind of role most in keeping with the Court's nature, community needs, sound planning and current realities; (e) developing detailed suggestions in the form of recommendations and a strategy for effecting changes.

Study of Court practice involved a year of field work in the five branches of the Court and the use of the following methods: observation (courtroom, probation, Bureau of Adjustment, information and petition desks); case reading and evaluation (probation, Bureau of Adjustment); analysis of procedures and of Court statistical reports; conferences and discussions. A group of expert consultants and an Advisory Committee reviewed the findings and inferences and offered helpful suggestions about recommendations.

It was found, in brief, that the New York City Children's Court has only partially achieved its objectives. In the course of its development, it has eliminated the grosser forms of mistreatment of children and has accepted, slowly but steadily, many of the newer rehabilitative concepts. However, personnel and procedures have been only in part oriented in the light of the best available knowledge and experience. As a result, a minority of children are treated with kindness and skill by judges and probation officers who have understood the purpose of Children's Court, are professionally equipped to perform their tasks competently and — at the same time — have available to them needed community resources. The vast majority receive service which does not reflect the juvenile court movement's aspirations or the skills available to fully qualified personnel. Improvement of the Court must be sought through measures to raise the caliber of judges, assure more qualified probation officers, define the roles of judges and probation officers, obtain certain basic adjunctive services and resources, strengthen those phases of procedure meant to protect individual rights and to initiate competent planning and treatment.

Microfilm copy of complete manuscript of 543 pages, \$6.79. Enlargements 6" x 8", 10¢ per page.

THE INTERPLAY OF SOCIAL
AND PSYCHOLOGICAL FACTORS IN
POLITICAL DEVIANCE: AN INQUIRY INTO
SOME FACTORS UNDERLYING THE
MOTIVATION OF INTELLECTUALS WHO
BECAME COMMUNISTS

(Publication No. 4206)

Herbert Ellis Krugman, Ph.D.
Columbia University, 1952

Fifty interviews with, and thirty-five psychoanalytic case histories of, ex-members of the American Communist Party were collected. Analysis of interview data lent support to the hypothesis that communism among intellectuals represented a broader and deeper kind of deviation than for non-intellectuals. When compared with trade unionists intellectuals were found more likely to have (1) been native born Americans, (2) come from middle class homes, (3) belonged to a regular party organization, (4) had early emotional adjustment problems, (5) joined the party independently, (6) been attracted by the opportunity to defy authority, experience excitement, and belong to an elite, (7) been ambivalent about "bravery", (8) satisfied unconscious needs through membership, (9) been "clinically" evaluated as hostile, and (10) been status-anxious.

With attention focussed on the intellectual psychoanalytic data were analyzed to show that the cases came from homes characterized by weak, rejected fathers. In consequence the sons grew up doubting their own masculinity and tended toward either exaggerated hostility (and intellectual competition) or submissiveness (and intellectual detachment) towards others. In either case the Communist Party offered a guilt-alleviating rationale for such behavior. Alternative solutions to the problem of weakness are available however. A psychoanalytic study of 27 anti-Semites and other data are marshalled to show that, on the level of basic personality structure, no significant differences exist between communists and fascists. The psychoanalytic data only suggest how particular rationalizations of particular problems work, rather than why one (political) rationalization is chosen in preference to another.

Because the psychoanalytic cases were predominantly the descendants of Eastern European Jews an examination was made of studies of Eastern European Jewish community life. It was noted that the mother traditionally dominates the home while the father dominates the religious-intellectual life outside the home. It is suggested that the weakness of the fathers noted in the psychoanalytic case histories is more apparent than real; i.e. it is a function of the American born child's use of new (non-traditional Jewish) reference groups and the incorporation of new (non-Jewish) values. Both the traditional husband-wife relationship and the absence of the father's traditional religious-intellectual world make the American child feel that his traditional Jewish father is weak. Not only does the loss of religion deprive the father of his traditionally high-status intellectual function but intellectuality itself has feminine connotations in

America which it never had in Eastern Europe. Nevertheless the Jewish child is brought up, as in Europe, to feel that intellectual achievement is most important, and that if successful in this area all other (status) blessings will follow automatically. He may feel cheated or cynical when older but he has a need to be recognized as an intellectual and particularly to have its masculinity accepted. Finally, he has a need to feel that his high status as an intellectual can be "converted" into other high statuses (e.g. as political expert, art critic, organizational leader, etc.). The Communist Party makes people feel like intellectuals, makes intellectuality look like an aggressive masculine characteristic, and makes it possible for the intellectual to feel like a political expert, art critic, etc.

A tentative conclusion of the study is that Jewish intellectuals who become communists recapture some of the status satisfactions which were once a traditional part of Jewish life. Their need to obtain such satisfactions is reenforced by culturally derived conflicts involving doubts about one's masculinity. Other data suggest a similar pattern among non-Jewish intellectuals.

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THE JAPANESE IN BRAZIL: A STUDY IN IMMIGRATION AND ACCULTURATION

(Publication No. 3974)

Marion T. Loftin, Ph.D.
Vanderbilt University, 1952

The objectives of this study include (1) an analysis of the Japanese immigration to Brazil, (2) a description of the location and distribution of the immigrants within the country and of the demographic characteristics of the Japanese element in the Brazilian population, and (3) an analysis of certain aspects of acculturation among the immigrants and their descendants.

The methods used in presenting the study are descriptive and statistical. The primary data are the personal observations of the author recorded during ten months of residence in Brazil. The secondary sources consist of the immigration statistics compiled by the National Department of Immigration for Brazil and the Secretary of Agriculture, Industry, and Commerce for São Paulo, the Brazilian Censuses of 1920 and 1940 and the São Paulo Census of 1934, and the statistics on births and deaths for São Paulo.

The major findings of the study may be summarized as follows:

1. Between 1908 and 1941 approximately 200,000 Japanese immigrants entered Brazil in an immigration movement designed to supply the Paulista fazendeiros with an abundant supply of farm laborers. Subsidized in large measure by both the state of São Paulo and the government of Japan, this

immigration was distinguished by extreme centralization and planned management. Throughout its duration it was entrusted by contract to Japanese colonization companies, whose activities in Brazil were supervised by the consular officials of the homeland. These companies were responsible for selecting the families for migration in Japan, for transporting them to Brazil, for locating them in the country on their arrival, and for supervising their activities afterwards.

2. The state of São Paulo received and has retained the lion's share of the Japanese immigrants. More than four-fifths of the 29,976 foreign-born Japanese enumerated by the Brazilian Census of 1920 resided in the Paulista state alone. In 1940, São Paulo contained more than nine-tenths of the 140,693 nationals of Japan enumerated by the census. Next to São Paulo, the Distrito Federal, Mato Grosso, Minas Gerais, and Parana contained the largest Japanese populations in 1920 and again in 1940.

3. The Brazilian Census of 1940 enumerated 140,693 nationals of Japan, 3,830 naturalized Brazilians of Japanese origin, and 104,523 native Brazilians of Japanese ancestry in the population. More than one-half of the foreign-born persons were concentrated in the ages under 30 and only 3.3 per cent were 60 years old and over. Among the foreign-born groups also there were 122.2 males for every 100 females. This compared with a sex ratio of 102.5 among the native Brazilians of Japanese ancestry.

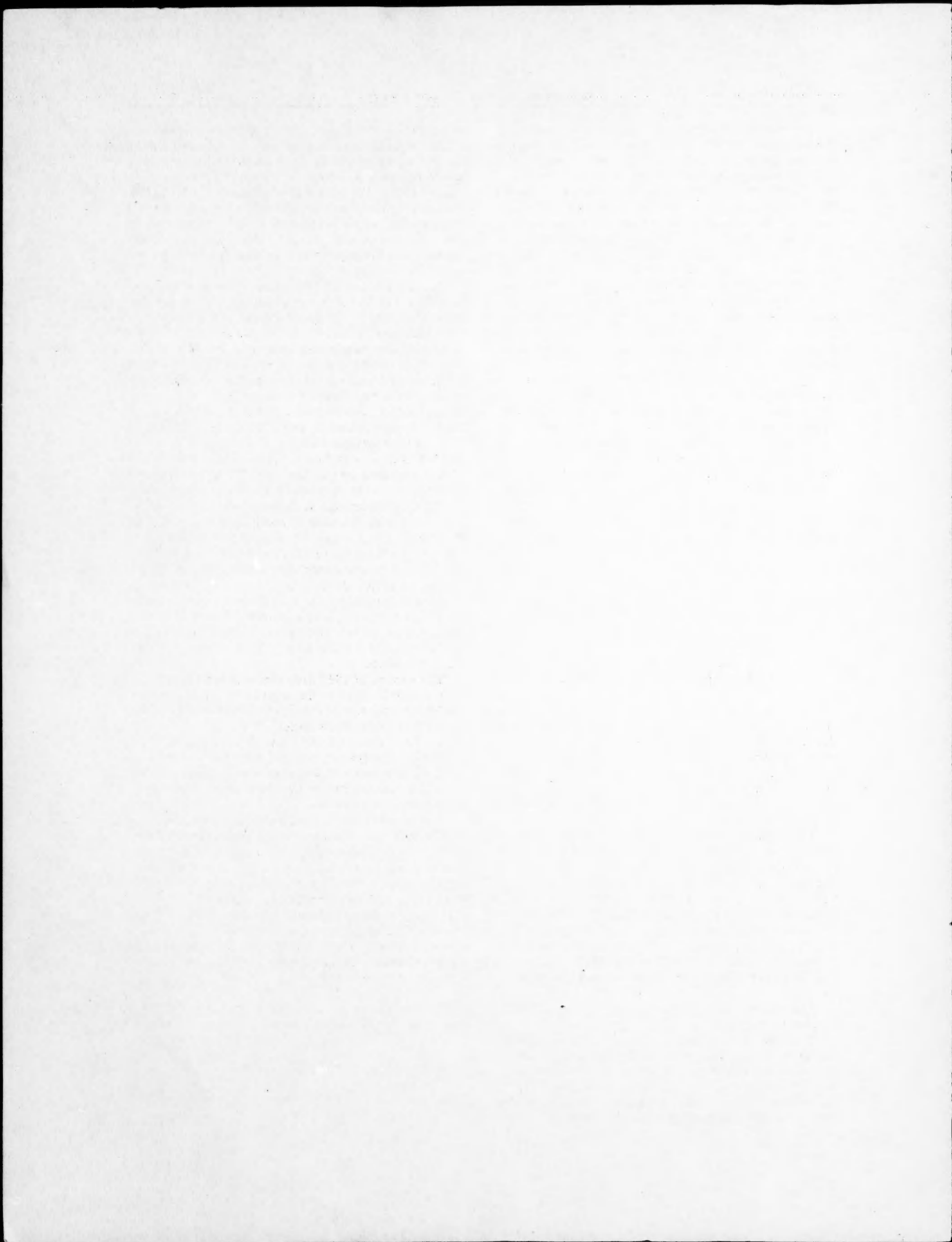
As determined by the census data on instruction for the amarelo (yellow) population 5 years old and over, approximately two-thirds of the Japanese males and one-half of the Japanese females were able to read and write.

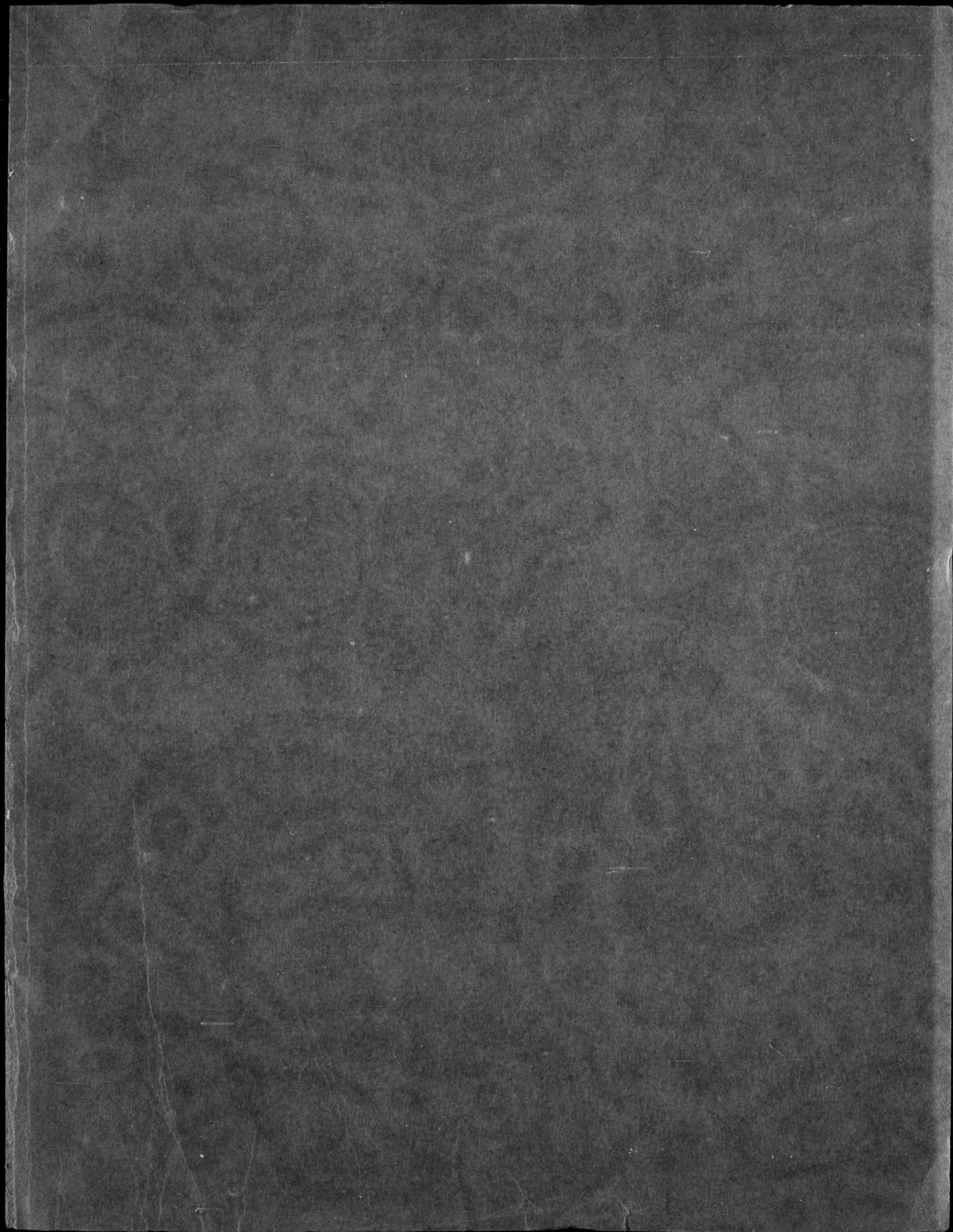
The census of 1940 also enumerated 125,000 Buddhists and Shintoists in the population. The overwhelming majority of these were Japanese immigrants and their descendants.

4. The organized and controlled nature of the Japanese immigration created certain conditions which have operated unfavorably with respect to the acculturation of both the immigrants and their Brazilian-born descendants.

On the other hand, the Japanese have never been able to isolate themselves from contacts with Brazilian culture and society. As a result of these opposing conditions, the situation with respect to the acculturation of the Japanese today presents a wide range of local variations. However, the inactivation of the colonization companies in 1941 and the disorganizing effects of World War II on the areas of Japanese settlement have contributed greatly to accelerating the acculturation of the Japanese throughout the country.

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DISSERTATION ABSTRACTS

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